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NOW that the most successful Convention of the American Gas Association is drawing to a close, you will all be preparing to return home to your respective companies and to your respective communities.

Filled with ambition and inspired by the many fine papers that have been read during this week, you will return fired with new zeal for the betterment and improvement of your particular company.

It will be a smooth running Company, especially the distribution end of it, if Sprague Meters are in your customers' homes. Accurate, day and night, under all pressures and all weather conditions; reliable as the sun; efficient as any man-made invention can be; Sprague Cast Iron Gas Meters are becoming increasingly better known throughout the gas industry.

We make two types. The Standard Type and the Dreadnaught Type. Bulletin No. 7 describes the Standard Type. Bulletin No. 8 describes the Dreadnaught Type.

SPRAGUE METER COMPANY
BRIDGEPORT, CONN.

Dreadnaught Type

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Smithsonian Deposit

Koppers Coal Gas Plant at WINNIPEG

We are pleased to announce the receipt of a contract from the Winnipeg Electric Railway Company covering the design and erection of a Koppers Coal Gas Plant to consist of 17 gas ovens of Koppers Improved (Becker) Type, having a capacity of 6.8 tons of coal per charge, together with a Koppers producer and coal and coke handling equipment.

This plant will embody the latest developments in coal gas manufacture. The ovens will be underfired with producer gas, but, if desired, can be heated with blue gas or oven gas. Provision has also been made for steaming of the ovens. The ovens are designed to operate on a normal coking time of twelve hours, which can be reduced to eleven hours or increased as desired, permitting of the greatest flexibility in the production of gas and coke.

This is the third Koppers Coal Gas Plant contracted for during 1923, the other two plants being located at Battle Creek, Michigan, and Zilwaukee, Michigan, respectively, and is a further indication of the increased confidence of the gas industry in the Koppers Company's ability to serve it.

Proof that this confidence is warranted will be found in the operation of these plants, which, we believe, will mark an epoch in efficient coal gas manufacture.

The KOPPERS COMPANY

Pittsburgh Chicago

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Vol. 119 No. 19 NEW YORK—OCTOBER 19, 1923—ATLANTIC CITY, N. J. Whole Number 3431

Record Crowd At Last General Session

Importance of Industrial Gas Business—Participation of All Gas Men In Creating Good Will—Selling Heat Therms

The record gathering of the 1923 convention of the A. G. A. assembled in the convention hall on the Steel Pier yesterday for the last general session. More than 1,000 members of the gas industry crowded into the hall and as the morning wore on practically every seat was taken.

Three speakers were heard at the session and four committee reports were placed before the body of the convention.

"The Importance to the Gas Companies of the Sale of Industrial Gas" was discussed in a talk by Charles A. Munroe, vice-president of the Peoples' Gas Light and Coke Company of Chicago, as the contribution of the Industrial Gas Section.

The need for gas companies seeking the business of organizations in a position to use gas industrially was emphasized by Mr. Munroe. In the past few years, he pointed out, there has been a gradual change of conditions which has brought about the situation where it will be necessary for the gas company to have this industrial business if it is to continue to operate at a profit.

LARGE PART OF GAS COMPANY'S BUSINESS UNPROFITABLE

The 3, 5 and 10 light meter business, the speaker pointed out, was becoming increasingly unprofitable and developments had reached a point where 80 per cent of the gas company's business was unprofitable.

Mr. Munroe told the difference between the gas business and the electric power business, mentioning some facts concerning the situation in Chicago. Of the total electric power sold in Chicago, he said, 76 per cent went into industrial consumption while 24 per cent was used for lighting. In the case of the gas consumption of the Windy City, 24 per cent was used industrially and 76 per cent for lighting purposes.

What was needed, he said, was pushing industrial sales, convincing possible customers of the economy of gas as compared to oil and electric power, and the assistance of appliance manufacturers.

Philip H. Gadsden, vice-president of the United Gas Improvement Company of Philadelphia addressed the meeting on "Public Relations — Their Improvement Through Gas Company Personnel." Stating that the future of the gas companies was going to depend on what use was made of the great body of employees and the extent to which they were used in educating the public, Mr. Gadsden pointed out that there were two sides to the business of selling gas, the manufacturing side, to which a great deal of attention had been paid and the sales side which had been badly neglected.

"We have made a great mistake,"

(Continued on page 429)

Public Relations of Utility Companies Discussed At Symposium

Speakers Touch On Customer-Ownership, Public and Company Contract and Public Ownership

Although public utility commissions are commonly supposed to regulate rather than promote competition, yet competition was suggested as the obvious characteristic of the evening when the Public Relations Symposium was held in the Rose Room of the Hotel Traymore, Wednesday evening under the chairmanship of the Hon. Harry V. Osborne, President of the Board of Public Utility Commissioners of New Jersey, who was fittingly introduced by President Brown, of the A. G. A. The competition was between the singers and the speakers, the latter conceding the victory to the former, who were the Madrigal Singers, of Philadelphia. They sang several selections in a way that showed thorough training and abundant enthusiasm.

Chairman Osborne, after referring appreciatively to the dinner given the visiting Commissioners

(Continued on page 430)

P. F. MACENANEY, Leaning on a "Superior" Support

'Twould Be a Dismal Place Without Mac

What a sad, dismal place the exhibit building would be without the happy smile and the hearty laugh of Mac's. P. T. McEnaney, Superior Meter Co., Brooklyn, N. Y., is one of the most popular men at the convention—and justly so. Every one likes him because he likes every one, and a few minutes with Mac will cure the worst case of the blues imaginable.

"I'm sold for the rest of my life on the convention idea," said Mac. "Heretofore I've known that there was an indefinite, intangible value to the gathering, but I had no direct results. Now I've had even that.

"For several years we have been trying, without success, to sell a certain Western gas company some meters. The buyer was courteous and reasonably friendly, but he would not put his name on the dotted line. Well, he came to the Convention, we had a little chat and became much closer friends as the result. To make a long story short, we sold that gas company fifty thousand dollars' worth of meters and diaphragms last year. If that is not getting results, you'll have to convince me.

"Sure, we are coming back next year."

Quietly Doing His Bit

James S. Kennedy Speaks a Word of Appreciation

James S. Kennedy, Superintendent Standard Gas Light Company's Works, New York, is a man who takes the A. G. A. Convention seriously. He attends as many sessions as possible, listens attentively to the papers read and in his modest way helps to make the Convention a success.

Mr. Kennedy is justly proud of the Automatic Control which bears his name and is built by The Bartlett-Hayward Company, Baltimore, Maryland.

"The credit from the development and exploiting of the Kennedy Automatic Control is due the Bartlett-Hayward Company," said Mr. Kennedy. "They have spent their time, brains and money in making it what it is and they deserve all the success that comes to them.

"No inventor could hope for more hearty co-operation than that which I have received and I am glad to have an opportunity to speak this word of praise and appreciation about my business associates."

Late last night there was a little incident outside room 418, in the Marlborough, occupied by Fred McDonald, of the American Meter Company.

One of the house employees was polishing a pair of shoes in the hallway in front of room 418, when he was interrupted by his superior who demanded to know why he did not take the shoes down to the basement and perform the operation there, as per rules, adding:

"Sam, haven't I forbidden you to shine shoes in the hallway?"

"Yas suh! I know dat suh! but dis yere genmmen done got hold of de shoe laces under de door and won't let go!"

Which proves a Scotchman never lets go of whatever he's got—if he can help it.

Great Demand for Trained Men in Gas Industry, Says R. J. Hole

"The gas industry has never been asleep, but we've allowed the Electric Companies to get a little ahead of us in educating their employees," said R. J. Hole, North Carolina Public Service Company, Greensboro, N. C.

"We in the South, members of the Southern Gas Association, are trying to remedy this situation, in so far as we can, by establishing a Chair of Gas Engineering at Johns Hopkins University.

"I think it is also important that Executives and Operators of Gas Companies lay stress on the possibilities and advantages to the young men should they enter the gas industry with the view of making it their life work. II feel there is a greater demand for trained men in the gas industry, and a smaller supply to fill this demand, than in any other of the Public Utility fields."

F. E. Newberry came out of the West a few months ago and when he returned he went as the Chicago representative of the Superior Meter Company, of Brooklyn, N. Y. F. E. came East for the big meeting with a pocket full of orders for meters. He is an old gas plant manager and talks the gas man's language.

R. J. HOLE

Last Industrial Meeting Well Attended

The last meeting of the Industrial Gas Section, held on Thursday afternoon, was very well attended. In fact, all the meetings of this newly created section attracted crowds of gas men, many of whom had to be accommodated in the hall outside the room in which the sessions were held.

The principal feature of the sessions were presentation of Industrial Booklets, prepared with great care and in complete details on subjects of vital interest to the industrial gas man.

Hourse Heating. By E. D. Milener, Fuel Salesman, Consolidated Gas, Electric Light and Power Co., Baltimore, Md.

Large Volume Water Heating. By W. T. Rasch, Engineer of Utilization, Consolidated Gas Co., New York.

One Thousand Uses for Gas. By H. H. Clark, Consulting Engineer, Peoples Gas Light and Coke Co., Chicago, Ill.

PROGRESS IN INDUSTRIAL APPLIANCES

There was also a very interesting and extended discussion on the progress made in the design and manufacture of industrial appliances. This discussion was opened by F. F. Cauley, Manager of the Industrial Gas Department, The Peoples' Gas Light and Coke Co., Chicago.

All in all, the industrial men are to be congratulated on the manner in which their meetings were held. The interest manifested in them was very great and as this was the first time that the Section met in a convention of the American Gas Association, it shows that the gas men of the company are really awakening to the importance of gas, as an industrial fuel.

J. P. Capron, Advertising Manager U. S. Cast Iron Pipe and Foundry Co., Burlington, N. J., has been a little under the weather lately. He insisted on coming to the big meeting, and between the enthusiasm of the meeting and the exhilarating effects of the Boardwalk air, he pronounced himself completely O. K. again.

J. S. RIDER

Good Will Must Be Developed

"Let's Get Acquainted Campaign," a Good Way

J. S. Rider, Manager of the Tri-City Gas Company of Gadsden, Alabama, believes that the development of good will between the Gas Company and the consumer is the goal towards which the industry should direct its efforts.

"Many men," said Mr. Rider, "are inclined to take good will as a matter of course. They think that it exists in their community and they go to no pains to either develop it or to increase it. To illustrate: Less than two weeks ago I was talking to a manager of a small gas plant in my locality. We touched on the matter of consumers good will and I asked him what he was doing to engender it. He told me that his company was giving good service, the consumers were all satisfied and he saw no reason to waste time doing anything at all along the lines of public education. Shortly after the conversation, three people moved from his city to ours and applied for gas service. I asked them about the service in his city and to my surprise every one of them knocked his service and the management of the company in general. This man is competent—do doubt about that—but he is asleep on the job.

J. B. KLUMPP Receiving Congratulations

"We must drive home, all of us, the necessity of the management analyzing local conditions, to determine to what extent the above unfortunate element prevails and the possible cause. Then we can formulate plans and persistently follow them up. We must keep in mind that this is one job that is never finished. The lack of good will is not due to poor service or high rates; but just a natural tendency on the part of the public to knock a public utility. In order to cure this coldness and lack of friendship on the part of the public, I think a 'Let's Get Acquainted' campaign might help us all. We can take them into our confidence, let them know that we are their servants, working steadily and consistently three hundred and sixty-five days a year. We take no vacations, work in good times as well as bad and are always ready and willing to please the people who buy our merchandise.

"I hope some general steps will be taken along these lines, the industry needs them."

The Fowler boys, of the Lovekin Water Heater Company, were leaning over the boardwalk railing, just South of "Steeplechase," watching a sand-artist modelling.

The design he was working on represented two men evidently struggling with a bull.

"Scott," said Walter, "do you know why that sand designer reminds me of Jim Wheeler, of the Baltimore Gas Appliance Co.?"

"That's easy," replied Scott, "they're 'Throwing the Bull!'"

"Right," responded Walter, "you guessed it!"

Superior Meter Dinner

On Wednesday evening the Superior Meter Company, Brooklyn, N. Y., gave a dinner at the Ritz to a party of western gas men. F. E. Newberry, Western Representative of the Superior Meter Company, presided. The guests included George McLean, Dubuque, Iowa; J. D. Von Maur, Engineer, St. Louis, Mo.; C. A. Jeffers, Toronto, Canada; George Wehrle, O. L. Mackel, T. M. Foulk, Frank Shafer, C. A. Harrison, Denver, Col.; Edward Coveny, Martin Cogwin, J. G. Gouldthrite, Minneapolis, Minn., and P. F. McEnaney, Treasurer, Superior Meter Company.

W. E. DERWENT, Geo. D. Roper Corp., As Genial as Ever

Gas Holder Business Good

Indications Point To A Prosperous Year

"Conditions in the gas holder field are excellent," said Wayne Stacey, of Stacey Bros. Gas Construction Co., Cincinnati, Ohio.

"Within the last thirty days the gas holder construction companies have received more inquiries and more actual orders than in any similar period in ten years. Orders are usually placed in January and February and June and July and it is a remarkable indication of the prosperity of the industry when users place orders in September and October.

"This condition of affairs has been brought about by a realization on the part of the large companies that they are going to need more capacity and they are covering their requirements now, rather than run chances of getting holders later.

"I do not put the least particle of faith in the talk of a reduction in the price of steel," continued Mr. Stacey. "This state of affairs is not likely to materialize. Most of the smaller steel companies which in the past have cut prices when business was slack, have now formed combinations of their own, or have been absorbed by the larger companies. This will prevent price cutting. The eight hour day will also have its effect, and I do not see how we can hope for cheaper steel.

"Should there be a slight reduction in the price of steel later it will be more than counterbalanced by the added expense of building holders under stress in order to give reasonable deliveries. The southern companies, especially, should look after their requirement now. The holder companies can now fabricate the steel and do all the work connected with the building of holders much cheaper now than they can in January and February.

"The general prosperous condition of our entire country, as attested by the gas men here in Atlantic City is evidence enough that good times are now with us and even better ones ahead."

Every Problem Has Been Solved

Improvements of Equipment Wonderful

"The A. G. A. has devised the only logical way to hold a convention," said E. D. Johnson, of O. H. & F. M. Roots Co., Connersville, Ind. "By having large and comprehensive displays of equipment and appliances we are enabled to check up the papers written by technical engineers and we get both the practical and the technical ends of the industry while we are here."

"I've been in the business over thirty years and the thing that impresses me most is that almost every problem the gas man has had in the past has been satisfactorily solved. Whenever an improvement has been needed some one has made it, and the crudeness in our equipment has slowly but steadily given way to finish and efficiency.

"I had the pleasure of designing the first high-pressure gas pump many years ago, and, therefore, it has been an especial source of satisfaction to me to see it come into its own.

"This convention has been an inspiration to all of us, and the men of our company are going back home determined to put our best into our product and keep it 'up to the minute,' so that it will be a credit to ourselves and to the industry."

H. J. CARSON, 1st V. P. Iowa Gas Assn.

Samuel E. Fairchild, Jr., of the Cruse-Kemper Co., Ambler, Pa., doesn't talk much.

He did, however, admit "that he was enjoying the convention hugely—that the exhibits were excellent and that he was happy and business was good." Probably the last three words in the above paragraph is the *reason* for his happiness.

He also added that the optimism of gasmen is infectuios and is prevalent everywhere among the assemblage.

Fred Weaver, of the Tappan Stove Company, of Mansfield, O., is on a diet. He claims to have lost two pounds one day and recovered it the next. What kind of dieting d'ye call that?

LAST GENERAL SESSION

(Continued from page 425)

the speaker pointed out, "in concentrating for many years so largely on the scientific side to the neglect of the commercial side of the gas business. There is a big field here with many difficulties to be overcome, and many problems to be solved. Selling to the public and selling by the promotion of favorable relations defines this situation fairly succinctly.

CREATING PUBLIC GOOD WILL A JOB FOR ALL GAS MEN

"In all that we are about to do, and it must be generally recognized that we have gotten to the point

EDWIN RIEHER
Pres. Southern Gas Assn.

where we are going to do something about public relations, we must remember that the job of public relations is not a one-man job. It is a problem of human, personal contact and requires mass action. We have the material with which to work in the great body of employees whom we have previously largely ignored."

Dr. E. W. Smith, of Woodall-Duckham & Jones, Ltd., of London, Eng., delivered the Technical Section's contribution to the general session. Dr. Smith's subject was "Experience of the British Gas Industry under the 'Therm' Regulations."

SELLING HEAT UNITS IN PLACE OF CUBIC FEET

Dr. Smith explained the introduction of the therm regulations in England as a war measure, when it was necessary to use different types of coal than had previously been used in gas manufacture. Rising costs in every line were given by the speaker as the reason for the therm question remaining before the public. A suggestion that an electric company which was seeking to make trouble for the English gas makers had been responsible for the latest public investigation, was also made by the speaker.

Arthur Hewitt, of Toronto, Ont., as chairman, presented the report of the Committee on the President's address. President Brown's talk, he told the meeting, had been replete with ideas and ideals which the gas industry would do well to pay close attention to. The words of the retiring president pointed like a guiding hand, he said, to the gas industry, showing in what way lay the greatest good, the best service, the utmost co-operation.

The report of the Committee on Resolutions was read to the meeting and was formally accepted. Among the resolutions adopted were those calling on each of the manufactured gas companies to adopt policies at once for furnishing the gas consuming public with more accurate facts concerning company affairs. One resolution stated:

"The use of newspaper advertising space for the attainment of better public relations is just as necessary to the gas industry as the purchase of coal for our boilers or oil for the manufacture of our product. Although the money appropriated for this purpose during the past year has increased more than one thousand per cent, gas companies should double that appropriation in the next twelve months. This recommendation is made with the fullest approval of the regulatory bodies who govern our affairs."

Secretary-Manager Fogg presented a consolidated progress report for those general committees which had presented no individual reports. D. D. Barnum, of the Boston Consolidated Gas Company, Boston, Mass., former president of the A. G. A. and present National Councillor, representing the American Gas Association in the Chamber of Commerce of the United States, reported on the work which had been done during the year in connection with the Chamber of Commerce and mentioned the fact that his co-workers had been instrumental in obtaining the selection of Philip H. Gadsden as a member of the Board of Directors of the Chamber.

J. J. HUMPHREYS, Toronto, Canada

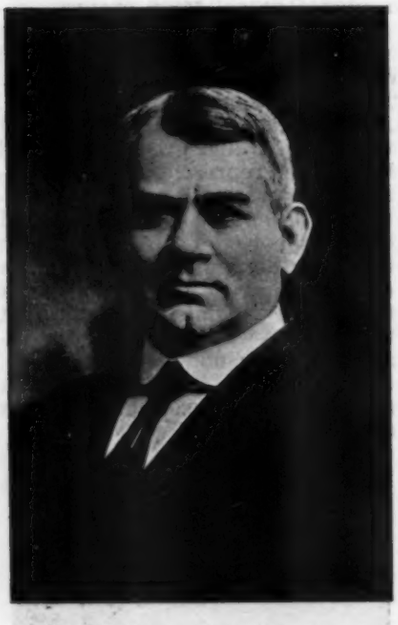
BOOST THE ANTE

That's darn mean of you
To show up the guy,
Who walked in the ocean
Because he felt dry.

Your offer of gold,
Won't find the guy's name;
A measly ten dollars
Will bring you no fame.

Come, make your bid higher
A hundred or more;
You've got to do that
So he won't feel sore.

"ED" COONEY.



The First Pres. Indiana Gas Assn.

PUBLIC RELATIONS SYMPOSIUM

(Continued from page 425)

by the A. G. A. Council and telling the audience of the very young and very hearty eater who told his nurse, "Pick I up and carry I out, but don't bend I," spoke of the difficulty of finding out what the public standpoint was, and then introduced the speaker on "Public Relations from the Public Standpoint," the Hon. Alexander Forward, Vice-President of the National Association of Railway and Utilities Commissioners and member of the State Corporation Commission of Virginia.

CUSTOMER - OWNERSHIP A FACTOR IN REMOVING DISCORD

Mr. Forward spoke particularly of the need of educating the public, saying that advertising helps to explain apparent difficulties and that one cannot begin the education too early; in some cases, the high school children have been successfully reached. He noted also that the character of the service rendered affects the public's inclination to run to the city council for relief. Mr. Forward also said: "It is essential that the executive furnish the material for publicity, which cannot be built on nothing. If we are stockholders, we look after the trouble ourselves. Customer-ownership will do more than anything else to remove misunderstanding and discord."

This was followed by a particularly inspiring address by the Hon. W. D. Ainey, chairman of the Public Service Commission of Pennsylvania, who discussed "Publicity and Public Relations." After stating, "I confess myself to be a pronounced individualist," he went on to describe the conflict between the basic individual rights and the increasingly complex organization of society.

CONTACT BETWEEN PUBLIC AND COMPANY

An interesting and complimentary standpoint was presented in the address on "Public Relations from the Commission Point of View," by the Hon. Henry G. Wells, member of the Massachusetts Commission of the Department of Public Utilities. Mr. Wells' remarks were, he said, intended to be constructive, and it seemed better to point to a few specific faults than indulge in glittering generalities, though, of course, these defects were infrequent and constantly decreasing. He had observed that the companies which did the most to set up proper public relations were most successful in avoiding difficulties. He gave many illustrations, but expressed the main points as follows: "There are three kinds of contact between company and public — letter, telephone, and direct. How much do the executives know of how these contacts are actually made in their companies? Whether inquirers can get information easily by phone? Whether the form letters are too formal? Whether the counter clerks are tactless? We have found that complaints reaching the commission result largely from underpaid or overworked complaint clerks or adjusters, from too little responsibility given to the adjuster, and from the customers' difficulty in reading the meter for themselves. The commissions are in existence to regulate and not to manage, and the companies should not be dependent on commissions to point out these matters."

The final speaker of the evening was F. G. R. Gordon, of Haverhill, Mass., who discussed "Public Ownership" with much picturesque illustration and easy command of statistics. He outlined the unfavorable results of public ownership in various parts of the world and urged more effective opposition to the radical labor forces in their endeavor to spread government ownership. His address was received with great applause by the large and distinguished audience.

The Pittsburgh Meter Co. have in their booth one of their No. 25 Westinghouse Positive Meters of large capacity. Although this meter has been primarily used for metering natural gas, it is here shown for the purpose of demonstrating its adaptability for high pressure commercial and industrial purposes. T. C. Clifford will let visitors look through convenient peep holes to see the "innards." Have a look.

DONALD MAC DONALD

He's Scotch, But He Hails From Louisville, Ky.

Second Commercial Meeting Discusses Sales Promotion By Window Displays

Commercial Men Are Told of Necessity of Ascertaintaing Sales Opportunities

Sales promotion, by means of window display, ascertainment of sales opportunity and public instruction in gas economy were taken up in the Commercial Section's session Wednesday afternoon.

"Window Displays as Business Getters" was the title of a paper by L. E. Lindsay, manager of the

E. P. GOULD
Interview Me? Nothing Doing. I'm Here for Pleasure

display section of the Peoples' Gas Stores, Chicago, Ill. Accompanying Mr. Lindsay's talk the meeting had an opportunity to see just how the Chicago organization arranges its windows as regards gas merchandise displays for the purpose of promoting sales.

The featuring of various lines to stimulate public interest, the changes in display, aesthetics and the like were brought out and the questions asked served further to indicate that mere volume of goods did not give the desired effect.

Following Mr. Lindsay's paper, Philmer Eves, of the New Haven Gas Light Company, New Haven, Conn., as chairman of the Home Economics Service Bureau Committee, presented its report.

In a paper entitled, "What Makes Your Holder Go Down at Night?" Jacob B. Jones, superintendent of the Bridgeton Gas Light Company, Bridgeton, N. J., told the meeting of the results of some personal investigation on the part of a company manager who, wondering why they were losing certain lighting business undertook to follow the gas mains.

"He found many instances where the gas lighting could be improved and a service car was sent to the house the next morning," Mr. Jones told the meeting. "The trip also developed many new prospects and a solicitor was immediately on the job. The consumer did not know why the service man or the solicitor called, but they were always welcome.

"These walks soon convinced the manager that he needed a trained man to cover the city regularly and inquire if the gas service was satisfactory, and to devote his principal efforts toward gas for lighting."

The promotion of the sales of gas lighting equipment, the increase in consumption of gas for lighting, and the equalizing of the gas load throughout the twenty-four hours just as it is familiarly the effort to equalize the gas load throughout the year followed in natural sequence, according to Mr. Jones.

The offsetting of the expense of maintaining good gas lighting by the cost of having idle mains was stressed in the paper and Mr. Jones also gave some tips as to how the gas lighting branch of the company's activity might be increased with no greatly increased expense to continue it in operation.

Discussion of the possibilities of economic lighting maintenance followed the paper. When this had been ended, Mr. Stetser, of the Welsbach Company, gave a demonstration of the efficient use of Welsbach mantles for the purpose of setting up gas illumination as a competitor of electricity.

FINAL THURSDAY MEETING

At the meeting yesterday two papers were read and a report of the Committee on Co-operation with the Plumbing and Heating Dealer was presented.

Both the papers were presented by members of the force of the Peoples' Gas Light and Coke Company of Chicago, Ill. G. C. Carnahan, manager of the Heating Division, presented a report on "Supporting Your Sales Organizations with Proper Water Heater Installations."

"Refrigeration—A Desirable Outlet for Manufactured Gas," was the title of the paper presented by H. D. Valentine, assistant manager in the same division.

F. H. Knapp, of the Pittsburgh Water Heater Company, as chairman of the Committee on Co-operation with the Plumbing and Heating Dealer presented the report for that body, concluding the session.

Tinnerman's Hobby

A Visable Stove Bolt Hurts Eyes

Most men have hobbies. Some like bridge, some play golf and others collect butterflies. A. H. Tinnerman, General Manager, Tinnerman Stove & Range Co., has a hobby. It is curing the ills of the gas range game. Mr. Tinnerman says it is criminal to punch a hole in beautiful, glassy, white enamel. It hurts his feelings to see that glossy service cracked or chipped, so he hit on a plan of putting his stove bolts back behing the whole works. They are there and they make the stove strong and sturdy, but they don't jar on any one's artistic eye.

A raw or rough edge drives Tinnerman almost insane, so he sees that the corners on his ranges are nicely rounded and smooth. And he's got a nifty little spring clip that stays put but does not jar your sensibility.

Second Accounting Section Told About Importance of Budget

With a continuance of its fine attendance record, the Accounting Section resumed its consideration of the four-part report of the Committee on Relations with Consumers. The members of the section listened to reports on "Co-ordination of Order-Taking and Order-Executing Departments" read by O. F. Potter, of Newark, N. Y., and on "High Bill Complaints," read by G. M. Hergesheimer, of Philadelphia, the chairmen of the respective subcommittees.

The report of Mr. Potter gave detailed suggestions for the physical layout of the departments involved in order taking and order executing and for the record forms and routine operations connecting them, concluding with a strong emphasis on the importance of selecting the right personnel. It was generally agreed that with the right methods and personnel and with proper attention given to real service, customers would hold to the company indefinitely

MONEY TAKING BY COUNTER CLERKS DISCUSSED

One point in this paper which drew quite a little fire was the question of giving temporary receipts for deposits and also whether counter clerks should receive money or make out the order and refer the customer to the teller or cashier.

Much discussion also followed the paper by Mr. Hergesheimer, which, as was later explained, had not attempted to cover the treatment of high bill complaints by letter, because of limitations of time. As one speaker after another joined in the discussion, it seemed that high bill complaints were not so much to be fered after all, and that there was more danger in the unexpressed feeling of dissatisfaction than in the complaint which actually reaches the office and can be investigated and explained. A few of the members had found it well to send out card inquiries to the customers as to whether service was satisfactory, but one man suggested that often customers did not know what satisfactory service was and that an annual house-to-house inspection, while expensive, more than justified itself in the confidence which it inspired. Several companies had found the use of the complaint or recording meter a valuable help. Mr. Doering warned against the overzealous salesman who tells the customer that so many cubic feet of gas will be required with such and such apparatus.

H. J. LaWALL Checking Up Expense Accounts at U. G. I.

IMPORTANCE OF BUDGET

Prominent among later reports was that on "Budgetary Control" presented by the Budget Committee, of which the chairman was F. H. Patterson, of Rochester, N. Y. This covered the Construction Budget, the Operating Budget, the Materials and Supplies Budget and the Cash Budget.

The other reports presented at that afternoon's session were that of the Insurance Committee, of which the chairman was J. G. Reese, Baltimore, Md., and the progress report of the Uniform Classification of Accounts Committee, of which the chairman was W. J. Meyers, of New York.

The presentation and discussion of committee reports was continued at the third and final session of the Accounting Section on Thursday afternoon. H. J. LaWall, of Philadelphia, as chairman of the Committee on Fixed Capital Records, read the report.

President-elect Klumpp, who had come in a few minutes before, was asked by Chairman Heins to address the Section, both as president-elect and as a noted valuation expert. He said that he had heard repeatedly that the Accounting Section was strong in discussion and he knew the value of their committee reports; his father had, he said, made him take a two-year course in bookkeeping and accounting before studying to be an engineer and he blessed him for it.

The concluding reports of the session were those of the Customers' Accounting Committee, with W. A. Doering, Boston, as chairman, and of the State Representatives Committee, of which the chairman was James Lawrence, of New York.

They have a one-word parrot over at the Radiant Heat Corporation of America booth which attracts considerable attention. You'll quickly recognize the bird by its brilliant, multicolor plumage, standing out in bold relief against a dark background.

The peculiarity of the feathered attraction is its persistence in resisting all efforts of its trainer and keeper, L. L. Campbell, to teach it to say anything else but the one word, "KENNEDY."

In every known language, living or dead, it can roll the word from its tongue letter by letter, K-E-N-N-E-D-Y. (You can actually see them suspended, as it were, in the air, in several of the better known languages). But to fully appreciate the wonderful intelligence displayed by this marvelous bird, you'll have to have a talk with his aforesaid trainer and keeper, Mr. Campbell, who understands him—she, or it—better than anyone else.

T. W. McKernan, Gas Engineer of the B. F. Sturtevant Company, Hyde Park, Mass., was seen floating around the exhibition halls picking out gas men and telling them all about Turbo blowers, boosters and exhausters.

Diversity of Subjects Discussed At Last Technical Section Meeting

The last meeting of the Technical Section was held on Thursday in Convention Hall, at the Ocean end of the Steel Pier. The meeting was well attended and each paper and report that was presented was given interesting discussion by the members.

The program consisted of the following papers:

Reports of the Committee on Fundamentals of Condensing and Scrubbing by the Chairman, W. H. Earle, of the Rochester Gas and Electric Corporation, Rochester, N. Y.

An address on Factors in the Design of Absorption Apparatus, by Prof. W. K. Lewis and Prof. W. H. McAdams, of the Massachusetts Institute of Technology.

Report of the Chemical Committee by the Chairman, A. C. Fieldner, Bureau of Mines, Pittsburgh, Pa. This report was delivered in several sections.

Report of the Deposits in Gas Pipes and Meters Committee, by Dr. R. L. Brown, Bureau of Mines, Pittsburgh, Pa.

Report of the Purification Committee by Dr. A. R. Powell, of The Koppers Co., Pittsburgh, Pa., Chairman.

A paper entitled Progress in Liquid Purification, by F. W. Sperr, Jr., of The Koppers Co.

R. L. FLETCHER, the Live Wire of the Providence Gas Co., Just Bristled With Ideas

A. E. Goodhue Here

Sold On American Gas Convention

"This is our first Gas Convention," said A. E. Goodhue, V. P. Chicago Pneumatic Tool Company, "and its scope has been a revelation to us. We were so impressed with the wide-awake activities of the gas men that we began wiring for our men, and altogether nine of them have been with us. If they don't absorb a lot of pep and energy from the crowd gathered here, then I'm going to fire them.

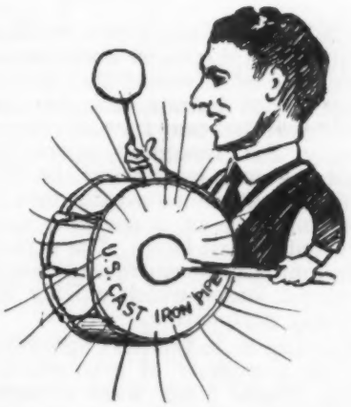
"This is a labor-saving age. Machinery is fast taking the place of human energy and compressed air equipment is taking its rightful position—leadership—in all kinds of work. When a machine can do in half an hour what it takes human hands five hours to do, then the machine will surely replace the hands.

"We're enthusiastic about the results we are getting here and we're coming back every year."

OLIVER H. SMITH
Consolidated Gas Co.

"Oo, Pop, Lookit the big Balloon!" is the invariable exclamation of the juvenile visitors, when they first glimpse the gigantic gas main bag in the Safety Gas Main Stopper Company booth.

Genial Pat Goodman tells the inquirer that this big 48-inch bag (it takes up about one-quarter of the space in the booth), is the largest size they make, and they sell them too—the Peoples' Gas Light & Coke Co., of Chicago, being a regular customer. Attached to the big fellow is shown the smallest size bag, 2-inches in diameter.



J. P. CAPRON Beating the Drum

Making Meter Diaphrams On the Steel Pier

"Seeing is believing." That truism is being proved daily at the American Meter Company's booth by a corps of experts brought from the factory to show the actual operations in making the diaphragms used in their meters.

Spread perfectly flat on a hardwood cutting-board is a hemlock-tanned sheepskin, from far-off Australia. With a deft movement a steel straight edge, of the required width, is slid across the skin and a knife, in the hands of a skilled operator, cuts a section of the leather. Drawing a sensitive thumb and forefinger across the next section, her experienced digits tell her if this section is of a corresponding thickness; if so, this piece is cut and passed along to the next operation, which is called pasting.

The two pieces are here examined and any imperfect piece is trimmed off; after which the two pieces are joined with cement, folded, and this joint too is cemented, forming a complete circle.

A number of these pasted circles are placed in a screw press and pressure applied to make the joints more secure.

The succeeding operation is to make the joining doubly secure by running through a sewing machine, thus forming a "felling stitch" which penetrates only one of the laps of the joint and *part* way into the other.

A puncture during this operation would ruin the usefulness of

the leather for diaphragm making. Seated in a darkened booth sits a keen-eyed miss, whose duty it is to search with infinite care for any punctures that may have developed during the foregoing operation. This she does by placing the diaphragm leather across the face of the olng tube of a specially constructed electric lamp. The rays of this lamp are concentrated through powerful lenses which quickly detect any perforation.

Passing on to the next operation we see a number of grooved, tin rings (these rings were brought down from the factory already made up); a strip of flesher skin is cemented in the groove to form a cushion.

Then two of these prepared rings are passed on to another workman, and this is an extremely delicate operation.

The operator places a ring in a winding machine and makes one complete turn of twine—made of the best Italian flax—around the leather-covered tin ring. With nimble fingers he then crimps the edges with mathematical exactness, then finished winding close together, three more turns of the twine; making four in all.

When winding, the machine was set so that there was a pull of 65 pounds, which insured close laying of the twine. The ends of the twine were then tied in a double knot—and then the twine is treated to a coat of shellac. The finished diaphragm is then immersed in oil, which closes all pores and renders the skin soft and pliable.

Harry C. Crafts, General Manager of the Pittsfield Coal Gas Co., came down by motor from Pittsfield, Mass., accompanied by five of his men; among whom was one chosen by vote of the Employees' Association.

This method of choosing one member to represent the Employees' Association at various conventions, by the balloting of the members themselves has been the policy of the company for several years.

Harry says it pays to let his workers in on the intricacies of convention life which, besides its educational value, is very effective in sustaining the good-will of his working force.

Central Hudson System Holds Banquet at Chalfonte for Twenty-two Hungry Hounds

With one of the largest and handsomest delegations at the A. G. A. Convention Gas House Smith and the gang gathered at the Chalfonte to do honor to the two attending members of the Advisory Board of Management, H. M. Beugler and L. P. Perry. After a sumptuous dinner Mr. Beugler, Master of Ceremonies, introduced the speaker of the evening J. H. Y. Kidd, who gassed about two minutes uncupped and went flat. The Kleagle Kommended Kaptain Kidd for his Komical Kappers.

If the representatives of the Connersville, Blower Company, Connersville, Ind., thought when they left for the big meeting that it was to be a leisurely outing at the sea shore, must have had a sad awakening, judging from the activities in their booths all hours of the day.

Our Seismograph, for recording automatically earthquake shocks, vibrated violently on Sunday night. Our observer, in the editorial offices in the Chalfonte, rushed to the window overlooking the Boardwalk to learn the cause of the unusual disturbance.

Peering out he saw nothing that would cause such violent vibrations, and yet they grew in intensity. Suddenly from around the corner of a building—that had obscured the view—came a roller chair containing the bulky forms of Geo. Cressler, of the Stacey Mfg. Co., and Bill Guitteau, of Stacey Bros. Gas Construction Co., propelled by a skinny little fellow who could not have weighed more than 40 pounds.

But the mystery of the vibration was solved.

J. J. Quinn, Vice-President of the Citizens Gas Co., of Quincy, Mass., is an enthusiastic member who has absorbed so much information during his visit that he remarked: "Since coming to the convention, I am so full of **gas** I dare not go near a naked flame! In fact, I am even afraid to strike a match for fear of causing an explosion."

Durgin Believes in Swift Action

Frank T. Durgin, of the Magee Furnace Co., believes in catching them quick. Early Sunday afternoon this genial live wire had a prospect seated in a wicker chair, close up to a gas range in full blast, expounding the merits of their insulated gas range. It is not known whether he had the man tied to the chair or not, or whether he was only hard to convince; but we made the rounds of the booths and when we returned the prospect was just rising from the chair. Such tenacity should carry its own reward. Good luck to you, Frank.

"What makes them go?" is the question asked by visitors who watch the red, white and blue pinwheels, spinning around on a spindle, in the booth of the Builders Iron Foundry.

The questioners are directed to a standard Venturi Meter Tube, mounted on a table directly in front of the pinwheels, through which air is passing.

It is this air that causes them to revolve. The Tube is connected with a Register—Indicator—Recorder instrument a short distance away, the air being used instead of gas, to actuate the mechanism in the apparatus.

Bob Caniff, of the Central Hudson System, was the recipient of a handsome set of baby "golluf" clubs, as winner of a furious foursome played on the Seaview links on Tuesday, over a nine-hole course.

Bob's only regret is that the clubs were plucked in their infancy, and remarked that he thought if he kept them under glass during the Winter and nurtured them well; swathing them in cotton to keep out the frost, that probably by next Spring they would develop into a set of *real* clubs. The presentation speech was made by Gas House Smith, one of the several "Smiths" now residing in the U. S.

The other three-quarters of the furious foursome comprised the following: "Bud" Acker, Score, 47; Geo. Bason, score, 48; "Scotty" Leckie, score, 49. The winner, Caniff, made it in 47. It was Bob's first game.

*Government Expert Advocates Gas Company Choosing Quality of Gas Best for Manufacture and Sale

Gas Should Be Made from Coal Most Accessible to Gas Plant

O. P. HOOD, Chief Mechanical Engineer, U. S. Bureau of Mines

I am, perhaps, quite out of place here, since I can lay no claim to being in the gas industry, nor can I bring to you a message concerning anything not already well known to you. There are some advantages, however, in being one of an audience rather than a busy actor on the stage. The exposition of a point of view may be helpful, and there are many messages that need repetition in order to impress them. What I have to say is from the standpoint of one curious as to our inefficient fuel practices, and with a desire to help in raising the general level of fuel utilization through that department of the Government specially charged with fuel studies.

The events of the past few years have shown very clearly that coal is an object of keen national desire. Our abundant supply has made us the last to seriously realize this fact. Nations are feeling that the future belongs to those countries having coal and a knowledge of how to use it. Those without fuel are frankly envious. Most fuel producing nations have lately provided some sort of machinery for studying the technical and economic problems that have grown out of the production, distribution and use of this essential resource with the object of conserving the supply. England has a Fuel Research Board; Canada its Dominion Fuel Board, Mines Bureau and special boards; Germany had state supported research laboratories and has a coal parliament. Switzerland maintains a small but efficient organization for the study of fuel problems. The U. S. Bureau of Mines is charged in its Organic Act with the duty of making investigations concerning fuels, and we have had our Fuel Administration, our Coal Commission, and a fuel distributor. Fuel and its rational use has become a matter of community interest far beyond its mere dollars and cents relationships. From the nature of the resource it cannot be replaced, and fuels with special qualities are definitely limited in quantity. To use wisely this store of energy which is shaping the outward forms of our present day civilization is, therefore, a national problem, and the gas man has an important part in it. He should discover wasteful tendencies and bad fuel habits, and substitute therefor something better.

DISTRIBUTION OF GAS COAL

We have just had the reports of a talented commission appointed to study the problems of coal production. Intricacy and confusion are what they find in this phase of the problem. If a similar high commission were to consider our fuel utilization problem the report would probably indicate a similar state. In the gas industry the most desirable source of supply of fuel presents a problem much more intricate than it should. If the flow of gas coal from each producing center to each gas plant were shown on a map the intricacy of the situation would be obvious. This is partly illustrated in the accompanying map (shown by the author at the session) which shows the several areas of production of gas coal and where it goes, insofar as incomplete returns to the U. S. Geological Survey will show. A study of this map shows that special coals from distant fields are hauled across and beyond other major coal fields. The Western Pennsylvania field supplies not only a region to the north and east which its geographical position would warrant, but it flows to Indiana and to Illinois in the face of an abundance of other coal. The East Kentucky fields supply not only the immediate vicinity and the natural territory to the southeast, but send across the central coal fields to Iowa, Missouri, Indiana and Illinois.

G. M. JOHNSON, Northern Indiana Gas and Electric Co.

The State of Washington has coal, but it gets its gas coal largely from Utah. All coal used in Illinois is hauled an average of about 170 miles, while its gas coal is hauled 400 miles. Missouri coal is hauled 180 miles, but its gas coal rides 450 miles. Iowa coal pays freight on 170 miles, but its gas coal pays for 600 miles.

The reason for this is not far to seek. The public utility maker of gas cannot always use the most available fuel, although it is well known that every user of a fuel first produces gas and then burns the gas he has made. The furnace under the steam boiler is only a producer of gas and a device for burning this gas. The interval between production and utilization is very short, and the distribution function is at a minimum. The man, however, who separates the production of gas from its immediate utilization, and takes advantage of its extreme mobility to distribute it over a large area, must pick and choose a special fuel, often going far afield for it.

CONDITIONS LIMITING USE OF COAL

Limitations, technical, commercial and legal, compel him to use this very special fuel, although usable gas could be made from almost any fuel. The practice of the time makes him seek a coal high in volatile matter, low in sulphur, and with a quality that will make a salable coke. Typical analyses are shown in the table. Such coals have come to be called gas coals, and the quantity available is limited. Insofar as available processes limit him to such special fuels these extra long and cross hauls may be justified, but the development and use of better processes is retarded by a confusion of standards of gas that take no account of the most available fuel.

These standards often require the continuance of another most intricate system of distribution, the distribution of an oil distillate added to that of the gas coal, so that the industry is partly dependent on the hazards of petroleum production. Oil must now be used to raise the heating value of the gas to some arbitrary standard fixed largely by convention and obsolete domestic equipment. It is extremely desirable that such arbitrary and unnecessary limitations be removed from the gas industry in order that the benefits of an extended use of cheaper gas may be enjoyed, and that economic waste be reduced.

GREATEST HEATING VALUE AT LEAST POSSIBLE PRICE

The fundamental problem before the industry should be that of furnishing

(Continued on page 440)

* Address delivered before Fifth Annual Convention, American Gas Association, Atlantic City, N. J. (Tuesday meeting of the Technical Session.)

*How to Get Industrial Business

Helpful Hints On Sale of Industrial Gas

ERNEST G. de CORIOLIS, Industrial Engineer, Lowell Gas Light Co., Lowell, Mass.

Some twenty years ago a class of freshmen was assembled at a lecture in chemistry during which the professor was demonstrating by experiment the production of some complex and odoriferous compound. The atmosphere soon became unbearable and the professor requested that some one go down to the basement and start up the electrically driven ventilating fan. Not one man in that class of over a hundred volunteered. Remember this took place just a little over twenty years ago. Today I venture to say that any boy of high school age would have no hesitation in starting up such a simple piece of equipment as a motor driven fan.

But in those early days it was not quite so simple. You had to go over to the engine room and apprise the old engineer that you were about to set in motion a mysterious contraption over at the chemical laboratory. It became his job then to throw in his switches, stand by the little D. C. generator and, as soon as the motor began to pull on the line, keep moving his brushes over the commutator until both motor and dynamo were up to speed and the old carbon filament lamp on the wall told him the voltage was just about right.

What tremendous progress in this brief span of years. Today, in this same laboratory, when the professor desires additional ventilation, he merely pushes a button at his side and a light shows him that somewhere in the basement the distant control switches have gone into action and started up the fan. The engineer responsible for generating the actuating current is a college graduate, sitting many miles away in his office studying efficiency charts and diagrams of load factors. For in this lies the mainspring of this great achievement of the electrical industry.

DISTRIBUTION OF LOAD ESSENTIAL TO PROGRESS

The men in charge early realized that progress was impossible unless the load could be reasonably distributed. Never could it develop if the load was to be restricted to a few peak hours of lighting in the evening and a still shorter period in the morning. Something must be done to fill in the gap, at least during the hours of daylight, and that something was necessarily a power load. There lay a virgin field to be invaded and conquered.

The John Jones Manufacturing Co., manufacturers of light galvanized hardware, had their own power plant consisting of a steam engine and two boilers. The Central Power Company went after the business and for the past ten years the John Jones Co. have been buying all their power from them and in steadily increasing quantities. And numerous other manufacturing plants in every town and city have in the same way been induced by their local power company to scrap their old steam engines and purchase all their power requirements from the central electric plant.

How did the Electric Companies do it? How did the automobile industry increase its production a thousand per cent. in a decade? How do you yourselves, gentlemen, and I am now addressing more particularly those of you who have charge of the commercial end of the industry, how do you account for the large increase in the use of gas stoves, water heaters, radiant fires and other domestic gas appliances during the past ten years?

POWER SOLD TO INDIVIDUAL USERS

The Electric Company became convinced that it had a highly desirable commodity to sell to individual power

JOHN V. HARTOG, Portland Gas and Coke Co.

* Delivered before the Tuesday meeting of the Commercial Section of the American Gas Association assembled in convention at Atlantic City.

users and it went out and sold it.

The automobile manufacturers became convinced that they had overcome the early mechanical difficulties so that all women could now operate a car. They went out and sold automobiles to them.

And you became convinced that you could show people how to cook better with gas. You advertised the fact, you enlarged your show rooms. You put men out to canvass the town and you sold gas for cooking. And I know you won't rest satisfied until the last coal range in your town has been carted away by the junk dealer or has taken its place in the local museum alongside the mournful sadiron.

SALESMAN MUST FEEL CONVINCED BEFORE HE CAN SELL

Now I am supposed to tell you how to get industrial gas business. There are many men in this audience who could tell you of dozens and hundreds of instances where they have substituted gas for other fuels in industry and are doing the job better than it was ever done before. Even more so. They will tell you of cases where some particular industrial operation could not have been performed were it not for the availability of gas. But if I make bold to sum up their experience in a few words, if I presume to tell you how they encompassed many notable achievements in the application of gas to industrial problems, I will say this: They became convinced that if it were done with heat, it could be done better with gas, and they went out and sold it.

The slogan to them became a real article of faith but they realized full well that unless they could make the prospective consumer see it in the same light, their efforts would be in vain. In other words, they knew they had a big selling job on their hands requiring salesmanship of the highest order, for what is the essence of selling but causing the other party to believe as you do? I cannot emphasize this fact too strongly and I know you will respond to it, for I am addressing a gathering of salesmen to whom rightly belongs the job of selling industrial gas. And I say it with a purpose, for in the minds of some it is looked upon as an engineering proposition to be handled by the plant engineer as something quite apart.

PLANT ENGINEER CAN RENDER ASSISTANCE

I have the highest regard for the plant engineer. He is the one who has made it possible for us to go to industry and offer a fuel unsurpassed by any other in quality, flexibility, dependability and uniformity. By all means let us call on his assistance, more particularly in the smaller companies where very often he is the only technically trained man, to figure out for us a heat balance, a power curve or a steam load. But I repeat it, gentlemen, this is a salesman's job. Leave it to the plant engineer and he will probably wait for the industrial problem to come to him. And he will keep on waiting while the oil companies are combing his territory every week with keen salesmen intent on selling oil wherever heat is applied, and the big electric equipment concerns install electric units at twice the operating cost of gas.

ADVISABILITY OF INDUSTRIAL LOAD NOT TO BE DISCUSSED

I won't enter here into a discussion as to the advisability or desirability of going after the industrial load. This is a matter which really concerns the management of the utility company and is scheduled for able handling and presentation later in the program of this convention. I shall merely assume that most, if not all, the companies here represented want to secure all the industrial business they can and the question with them is how to go about to achieve this end. And I shall also assume that by now every man here present is thoroughly sold on the value of his commodity and realizes that it is his job to go and sell it to others.

GEORGE W. PARKER, St. Louis, Mo.

FIRST LOCATE PROSPECT

His first problem, quite evidently, is to locate his prospect, not wait for the prospect to locate him. Like in every selling campaign, a list must be compiled of all the potential users of industrial gas within the compass of the distributing system. The officials of this Association have already supplied you with information as to the type of operations where gas can be used and this will soon be supplemented by a comprehensive booklet in course of preparation by the new Industrial Section. I won't take up your time in discussing the smaller and more obvious gas applications, for I assume that you have all successfully sold candy pots, batch warmers, restaurant ranges, cabinet baking ovens, and small boilers to tailor shops, creameries, hat shops, etc.

But what about the John Jones Manufacturing Co., hardware manufacturers, and for the past ten years a good customer of the local Electric Light Company? Have you familiarized yourselves with their operations? Quite probably they are not even customers of the Gas Company. What about calling on Mr. Jones some morning and telling him something about that wonderful commodity of yours? You may be surprised that he had never thought gas could be of any use in his establishment. He will confess that the gas range you put into his home a few years ago was a great improvement over the old cook stove and the new water heater you installed last spring is proving a great comfort these chilly October mornings when he wants a warm bath and all he has to do is to turn on the tap. And without realizing it, the thought is already entering his mind that if gas can prove so valuable in his home it might very well have some useful applications in his factory.

Possibly Mr. Jones will be busy that morning and won't have very much time to give you. But he will doubtless invite you to drop in again and, as a reminder, you will either leave with him an article, pamphlet or publication that will serve to focus his attention on your commodity.

GO PREPARED WITH DATA ON PROBLEM

The next time you call he will naturally be more receptive. You might then suggest that you would like to see something of his operations, and he will turn you over to his superintendent or take you through himself. This is your chance. You go in with your eyes wide open, for you have already determined that the class of hardware manufactured by Mr. Jones being galvanized will require hot cleaning, pickling and subsequent dipping in molten spelter. You may find very much to your surprise that he keeps a hundred horse power boiler going all summer long to supply a little steam for heating his cleaning tanks, and a long line runs to the men's locker room and another to the office to supply a little hot water.

KEEP YOUR EYES OPEN IN THE PLANT

When you get to the metal dipping room you will find a dirty place with

ashes all over the floor and possibly some men waiting with a stack of work nearby because "Jim" that morning failed to start the coal fire early enough and as a result the metal is not yet sufficiently hot to dip the ware. In a corner of this same room you may find a blacksmith with his coal forge attempting to temper pieces of high speed tool steel and ruining two out of every three. Other things you might see, but this is quite enough for one day.

You make mental notes of all this and on the way back to the office you decide that obviously the water heating proposition offers a real opportunity for the introduction of gas into this plant. Besides it is something with which you are pretty familiar and can discuss with confidence. The other things can wait. By this time you will have got Mr. Jones in the frame of mind where he is willing to discuss figures with you. You can get him to tell you how much coal he burns in summer and how much he pays his fireman. If you press him too closely for details of operation he will get hazy as to exact figures but you now feel free to have a talk with the superintendent or foreman from whom you are sure to gather useful information.

OBTAIN CONFIDENCE OF MAN IN THE SHOP

The way is now open for you to do some real selling. Remember it is of the greatest importance for you to get the confidence of the man in the shop and considerable effort sometimes must be exercised in this direction. You are aiming to place a new tool in his hands. If he likes it, if you sell him on gas at the start, he will become a booster for your product and will help you in securing the consent of the management. On the other hand, if he is hostile or even lukewarm, although you subsequently concentrate your best efforts on the head of the concern, you are likely to fail, for no executive today will foist a new device, tool or piece of equipment on the man in the shop against his opposition.

I lay emphasis on this as one of the cardinal points in selling industrial gas. Recently the head of a small newspaper, after considerable effort to get him interested, finally consented to have the gas company go over his stereotype room with a view to converting this operation from coal to gas firing. This newspaper was housed in a modern plant, a model of cleanliness. Gas had been in use for some time under the linotype pots, linotype recasting pot and steam tables. Every one connected with these operations was perfectly well satisfied. The one-ton stereotype pot and casting machine were in a separate room. Two metal cans were used to hold the day's requirements of coal and a third can was for ashes. Not a particle of coal or ashes was to be found on the concrete floor which was swept clean. From the standpoint of cleanliness, gas had very little to offer. Nevertheless the foreman seemed to be favorable to gas. He had worked in another plant where gas had been used and knew all about it. Casually he referred to one instance where gas had cracked a metal pot but at the time not much attention was paid to this. A proposition was presented to the management and was promptly turned down with the statement that they preferred to leave well enough alone.

WATCH OUT FOR WRONG INFORMATION REGARDING GAS

Subsequent investigation showed that the foreman was responsible for this failure. He had told the management he would be willing to use gas as it would improve things somewhat, but they must be prepared to replace the pot within a year as gas was fatal to metal pots. Right in this same town is the opposition newspaper which has been using gas for years and has not yet cracked a pot. Again, gentlemen, let me repeat: Be sure to sell the man in the shop first before you put up your final proposition to the management.

SOME ACCURATE ENGINEERING AND COST DATA

The next point of importance in getting industrial business is to secure accurate facts on which to base your proposition. When you sell a range, a water heater or some other domestic appliance you are in the true sense of the word engaged in merchandising. Your appeal is to the senses. Your prospect generally knows very little about economics but possesses strong likes and dislikes on which you play in consummating the sale. In selling industrial gas the reserve is usually the case, and the bigger the job, larger looms up the economic and smaller dwindles its intangible value. Go into a forging shop to replace oil with gas and the factor of cleanliness is reduced to a minimum. Your case must then rest almost entirely on your ability to turn out finished forgings cheaper with gas than with oil.

A. G. SCHROEDER, Secretary Michigan Gas Association

The cost of revamping the oil furnace or replacing it with an entirely new gas unit will likely run into quite a sum on which interest and depreciation will have to be figured. The actual fuel bill, generally speaking, will be larger when using gas. To offset this you must be able to show increased production per furnace and per man, a reduction in spoilage, a cleaner and more uniform forging and, if possible, improved conditions around the furnace which will make the operatives more contented with their job. To do this necessitates making a careful study of operating conditions in the plant. You may have to spend several days at intervals and possibly stay on the job right around the clock for the full twenty-four hours, in case of a three-shift plant, so as to know just what you are up against in making up your estimates on gas. You will find out the number and weight of billets heated, variations in temperatures, number of spoilt pieces, delays in operation and causes, labor employed in loading, unloading, handling, etc. The furnace will have to be studied to determine whether it should be revamped or scrapped. This will also afford you the opportunity to get on a friendly basis with the operatives and have them feel favorably towards the proposed change.

INDUSTRIAL USES OF GAS AN UNFAMILIAR FIELD TO MANY GAS MEN

Right here we might just as well face a fact which I know is uppermost in the minds of at least a few of you. For years you have been devoting your energies to selling gas through the means of domestic appliances. You are thoroughly inversant with ranges and water heaters but you have with spelter tanks but the merest nodding acquaintance, and with billet forges none at all. You are quite capable of talking about the advantages of gas to the head of the concern and getting him interested to the point where he will consent to have a study made of his particular conditions. You are quite able, ready and willing to go that far, but when it comes to looking a fiery furnace in the mouth and examining its teeth, you feel like delegating this task to some one more accustomed to taming these snorting monsters.

But where will the man come from who can step in and take hold of the industrial problem? To the large utility com-

pany, with millions of resources, the question is easy of answer. They can secure the best talent available and place under them as many men as are found necessary to adequately cover the large territory served. Not so with the smaller company that can count up to fewer than a score the number of industries encompassed by its distributing system. To what extent is it justified in adding to its staff men capable of handling industrial problems? This must be determined by local conditions. If in a town there were twenty shoe shops and no other industries, we know right away that the most capable of industrial salesmen could not increase the total sales of gas by more than one million feet or so per month, and it would take him some time to do it. An adjoining town with but one or two good metal shops, a substantial bakery and a dozen other small industries, on the other hand, would offer possibilities for many million feet per month increase and would certainly justify some concentrated effort on the part of the gas company. The question will then arise as to what grade of a man to get.

THE KIND OF MAN REQUIRED FOR THE JOB

We can't expect a young technical graduate, who has had very little, if any, experience in industry, to walk into a brass foundry and tell an experienced foundry man how to melt brass. Nor are we justified in putting him up against an experienced metallurgist who for years has specialized on heat treatment of steel. On the other hand the potential increase in gas consumption does not warrant expenditure of a man whose knowledge and past experience would necessarily require an adequate salary. This is the hiatus which must now be filled if gas is to become the universal industrial fuel.

The electric industry was able to solve the same question largely because the application of its commodity narrowed itself to but few uses, easily handled by a young engineer with the tremendously helpful assistance of the sales forces of the large electric equipment manufacturers. The diversified uses of gas, however, largely complicate the problem and there is no assistance forthcoming from a gigantic "General Gas Equipment and Manufacturing Corporation." Not that the existing gas appliance companies are averse or unable to render such assistance, but we cannot expect them to put much effort in the sale of a $500 piece of equipment from which the gas company, with little or no effort, will derive a revenue several times that amount the first year and for every succeeding year thereafter.

INITIATING NEW BUSINESS LIES WITH GAS COMPANY

Clearly the work of initiating new business rests with the gas company. It must first survey its field to determine its possibilities and do the preliminary work of at least selling to the prospect the idea of industrial gas. This should be followed by retaining a young man, preferably technically trained, but one having at least some technical knowledge, capable of going into a manufacturing plant and determining the facts involved. If the job then proves large enough, the equipment companies may be depended upon to render such technical assistance as may be necessary in effecting a sale.

A. F. DAVEN, Chairman Gas Section, Wisconsin Utilities Association

THE QUESTION OF THE GAS RATE

I have purposely left for final consideration the question of gas rates, nor do I propose to affirm what each individual company should or should not do about industrial rates. We do know that for certain processes gas is the only possible fuel and it does not take much effort to sell it at almost any price. For other processes, however, it is but one of several fuels and can be sold on a competitive basis only at such rates as are often below its manufacturing cost. Between these extreme points lies a wide field of application where the rate question plays a part varying in importance with the refinement in the use of the fuel. How far a company is justified in lowering its rates to secure a particular sale of industrial gas is largely a matter of business to be decided by the management. First let the company decide that it wants industrial business and that it is prepared to establish such rates as will help to secure it at a profit. Then work up your proposition to the point where you can tell the management you can sell one hundred thousand or one million feet of gas to the John Jones Manufacturing Company if you can contract at such and such a rate.

Remember, and I repeat it, yours is a salesman's job. First, you must sell yourself thoroughly as to the inherent value of your commodity in industry. Then, in turn, you must sell the same idea to your prospect, the man in the plant no less than the executive in the office. You have been told over and over again that gas is the best, the cleanest, the most flexible, in the long run the cheapest and most ideal fuel for industry. Go out and sell it.

American Gas Journal

SIXTY-FIFTH YEAR

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CHOOSING QUALITY OF COAL

(Continued from page 435)

the greatest heating value in the form of gas at the least possible price per heat unit consistent with good business. The public has gained the impression that this has not always been the aim of gas companies. Ears are, therefore, dulled to those technical arguments that would induce them to lower the B. t. u. standard of gas. This is unfortunate, because the maintenance of such standards may be directly opposed to the public interest.

The consumer should realize that the heating value of the gas-air mixture which is ignited at the surface of his burner is somewhere in the neighborhood of 90 B. t. u. per cu. ft., whatever may be the heating value of the gas before the consumer dilutes it with air, and that the temperature of the flame may be even higher with the lean gases that require the less dilution. It is not necessary nor desirable for equally satisfactory service that every community should have the same kind or grade of gas. Illustrations of perfectly satisfactory service can be found with gases ranging from 300 B. t. u. per cu. ft. up. The accompanying table shows the heating value of several gases as diluted for use at the burner. Uniformity of quality and proper adjustment of apparatus are much more important to the consumer than a high heating value standard. He should be able to buy his gas on its heat value rather than by its bulk, and the gas manufacturer should be free to declare a standard for gas which will enable him to use the most available fuel and one naturally tributary to the district in question. These are the factors most important to the consumer. There will follow a greater usefulness of gas, a lower cost of production, a more stable supply of fuel, and a better use of our transportation system, all desirable objectives.

When each coal field shall satisfy the needs of a region naturally tributary to it, with a minimum of transportation charges, an ideal condition will have been reached, and it should be the aim of technical processes, community habits and legal enactments to approximate this condition. It is very fortunate that one state in our Union (Colorado) has lately taken this point of view, and it is hoped that the service received by the public under this more rational and liberal law will be so conspicuously satisfactory that it shall speedily become the universal practice.

ERNEST A. HILLS

TABLE SHOWING CALORIFIC VALUES AND THEORETICAL FLAME TEMPERATURES OF THREE SIMPLE CASES

COMPUTED BY GEO. S. BREWER

	Complete Combustion Of		
	Carbon Monoxide	*Hydrogen*	*Methane*
B. t. u. per cu. ft. of gas, 60 degrees F., 29.9 in. (gross value)	323	325	1008
B. t. u. per cu. ft. of gas-air mixture as burned	92	93	92
Theoretical flame temperature, 0-F	2650	2550	2450

TABLE SHOWING CALORIFIC VALUES OF GAS-AIR MIXTURES OF THREE TYPICAL COMMERCIAL GASES

COMPUTED BY GEO. S. BREWER

Constituent Gases	*300 B. t. u. Water Gas*		*600 B. t. u. Carb. W. Gas*		*450 B. t. u. Coke-Oven Gas*	
	Per Cent by Volume	*B. t. u. per cu. ft. as Burned*	*Per Cent by Volume*	*B. t. u. per cu. ft. as Burned*	*Per Cent by Volume*	*B. t. u. per cu. ft. as Burned*
CO—2	8.2		4.8		3.2	
Illuminants	1.4	1.4	12.8	12.7	3.0	3.0
O—2	0.3		0.3		1.0	
CO	34.0	31.4	29.2	26.9	9.6	8.9
CH—4	1.9	1.9	14.2	14.0	22.8	22.6
H—2	50.4	46.8	35.0	32.5	41.5	38.5
N—2	3.8		3.7		18.9	
Total	100.0	81.5	100.0	86.1	100.0	73.0

NOTE

The papers and reports, appearing in this Convention Daily, have been abstracted in most cases, considerable matter having been deleted for want of space. Similarly a number of papers delivered at the meetings held as per official program have been omitted. It is planned to publish these papers in later regular issues of the American Gas Journal. Complete papers and reports can be obtained from the American Gas Association.

Purification

Report of the 1923 committee. Attention paid to other impurities in gas besides hydrogen sulphide—Evaluation of iron oxide

Dr. A. R. Powell
Chairman, The Koppers Company, Pittsburgh, Pa.

The following report of the Committee on Purification of the Technical Section of the American Gas Association was read to the Thursday meeting of the Section at the Atlantic City Convention.

Outline of Work

THE work of the Committee for this year has been directed along somewhat other lines than the committees of the last few years. In accordance with the request of the Managing Committee, more attention has been paid to the objectionable constituents of gas other than hydrogen sulphide. The majority of work in the past has emphasized iron oxide purification rather strongly, and although a very important contribution has been made to this year's report on the commercial evaluation of iron oxide, the major part of the committee's activities has been directed towards organic sulphur and cyanogen in gas. Liquid purification, which is one of the outstanding developments of modern gasworks practice, has also received attention, and a paper is to be presented this year which will bring this subject up to date.

Work of Committee

The work of the committee may be divided into four major parts.

1. Organic sulphur in gas. Data on the amount of organic or fixed sulphur in gas from different plants were collected by J. B. Craven of Chicago and are submitted as a part of this report. (Appendix A.) Various members of the committee co-operated in this work, as well as several others not on the committee.

A. R. Powell prepared a resume of processes which have been used for the removal of organic sulphur from gas with particular reference to American gas practice. (Appendix B.)

2. Liquid Purification. The committee as a whole did no work on this subject, but a paper is to be presented by F. W. Sperr, Jr., which will bring together information gleaned from several plants where this process has been installed.

3. Cyanogen in Gas. W. A. Dunkley investigated this problem with special attention to the corrosive properties of cyanogen in gas. It was found that little or no data were available on the subject, but the committee finds that at least two investigations on this general problem are being carried on by gas companies, and that the data so collected will be available at a later date.

4. Correlation of Laboratory Tests and Plant Results as regards activity and capacity of oxides. The laboratories of the Consolidated Gas Company of New York have been carrying on investigations of iron oxide for several years, and the summarized report of C. A. Lunn and W. L. Kohlmann, which is published separately from this report but as Appendix C thereof, is the culmination of this work. This investigation clears up many doubtful points raised in connection with the commercial evaluation of iron oxide, and should prove of considerable interest to laboratories which test oxides for gas purification purposes.

Appendix A

Organic sulphur in gas from typical plants
Legal limit never exceeded

Data collected by J. B. Cragen

The organic or fixed sulphur content of gas is very seldom determined, despite the fact that state and municipal regulations often limit the quantity of total sulphur in the finished gas. This has been due very largely to the assumption, which has been confirmed in most cases, that the organic sulphur will always remain under 30 grains per 100 cubic feet, and that the purification process will eliminate all but a trace of hydrogen sulphide, thereby assuming that less than 30 grains of total sulphur, the usual legal limit, will be present in the gas.

The Committee on Purification for last year collected some data on fixed sulphur in gas by the questionnaire method. This resulted in some data on the amount of total sulphur in the purified gas. The variation in the fixed sulphur content at different points was not determined, however, in most cases, and furthermore no attempt was made to differentiate between the true fixed sulphur and traces of hydrogen sulphide. The results of this survey, with possible practical applications, have been described by J. B. Craven and W. A. Dunkley.

In order to gain further knowledge of the fixed sulphur content of gas at different points of the purification system and in different types of installation,

this year's committee undertook investigation of the subject. Different members of the committee performed tests in their own plants, and in some cases secured the co-operation of other plants.

The data so secured represented water gas plants, vertical retort plants, inclined retort plants, and coke oven plants. Where iron oxide purification was used, the organic sulphur content of the gas was determined at both the inlet and the outlet of the boxes. In some cases the fixed sulphur was also determined at the inlet of the exhauster and the inlet of the P. and A. extractor. In one plant the Seaboard liquid purification process was used, and analyses were made for organic sulphur at the inlet and outlet of the absorber. In another case determinations were made at the inlet and outlet of the light oil scrubbers. The results of this survey cleared up several points concerning the fixed sulphur content of gas.

The method of analysis which was used was designed to give an accurate measure of the organic sulphur, as differentiated from any hydrogen sulphide which might be in the gas. The sample of gas for the determination was first passed through a train of bottles containing a neutral solution of cadmium chloride. By this means the hydrogen sulphide was removed without causing any appreciable amount of organic sulphur to be removed. The gas was then metered and burned in a Referees apparatus in the usual manner.

Results Obtained

The results of this survey are summarized in the attached table.

Date	Organic Sulphur in Gas Grains Per 100 Cu. Ft.				% Sulphur in		H_2S at Inlet of Boxes Grains Per 100 Cu. ft.	Steam Introduced With Gas in Boxes	Temp. at Inlet of Boxes °F	Cu. Ft. Oxide Per Million Cu. Ft. Gas Per Day
	In Exhauster	In Pand A	In Boxes	Out Boxes	Coke	Oil				
Plant "A"										Water Gas
March 19-23	...	17.9	...	11.9	1.14	Avg. for	210	No	85	10,350
" 26	9.5	9.0	9.1	7.8	1.05	(1920)	140	"	80	10,761
" 29	...	10.3	12.4	...	1.05	0.19	140	"	95	7,371
April 13	...	...	5.8	4.0	1.05	(1921)	120	"	80	11,370
" 15	...	...	10.6	9.4	1.09	0.29	160	"	80	9,828
June 20	...	...	Lost	8.9	1.99		140	"	90	6,568
Plant "A"										Verticals
	In Seaboard	Out Seaboard			Coal					
March 1-23	...	...	13.5	16.8	1.69	...	290	No	59	5,144
" 6	22.1	22.6	...	...	1.57	...	70	"	74	5,144
April 10	...	...	8.2	8.8	1.07	...	50	"	62	5,144
" 13	8.7	11.1	...	...	1.07	...	40	"	61	5,144
May 15	...	...	15.3	14.6	1.22	...	30	"	64	5,144
" 17	16.2	14.9	...	...	1.22	...	40	"	62	5,144
June 21	13.6	12.8	11.5	13.9	0.87	...	60	"	87	5,144
Plant "B"										Inclines
April 9	...	...	22.5	10.1	...	...	...	No	...	....
" 17	...	...	21.5	19.3	...	...	...	"	...	....
May 15	...	...	12.2	11.5	1.47	...	480	"	80	5,693
June 8	...	...	13.0	12.6	1.43	...	520	"	80	6,234
Plant "C"					Coke					Water Gas
April 10	...	...	3.70	4.32	.64	.80	115	No	80	2,270
May 16	...	...	4.57	3.86	.64	.80	95	"	81	2,270
June 3	...	...	5.67	4.25	.64	.80	105	"	90	2,270
Plant "C"					Coal				Coke	Oven Gas
June 20	...	...	6.65	5.26	.75	...	200	No	100	3,666
" 21	...	...	8.99	8.42	.75	...	210	"	97	3,666
Plant "D"										Water Gas
April	...	...	11.53	5.42	.647	1.40	110	...	...	....
Plant "A"										Mixed Gas

	In Lt. Oil Scrubbers	Out Lt. Oil Scrubbers	Proportion of Coal to Water	Gas
Feb. 19	18.0	16.6	57	43
April 9	12.3	10.3	61	39
May 17	8.5	8.0	54	46
June 19	16.1	18.2	62	38

The principal fact brought out by this survey is that the organic sulphur in all the plants studied was always less than 30 grains per 100 cubic feet. In most cases it was very considerably less than this. This corroborates the results obtained last year. In general, the conclusions arrived at after last year's survey are strengthened by this year's committee work.

The results obtained from the tests on comparatively fresh oxide seem to show that greater removal of organic sulphur is obtained in the boxes than with oxide which has been in use for some time. Also, in boxes which are very nearly fouled, the gas has a tendency to pick up organic sulphur. As a general rule, however, the organic sulphur content of gas does not change appreciably while going through the boxes.

In going through the absorber of the Seaboard liquid purification process, no significant change in the organic sulphur content takes place. This bears out previous observations. Another point of interest is that the mixed gas, the last one listed in the table, shows no change in the organic sulphur content after passing through the light oil scrubbers. Scrubbing of the gas by paraffine oil is practiced by some plants to decrease the organic sulphur, but apparently in this case the organic sulphur content of the gas is so low or some other condition is different which prevents such results.

There seems to be no very constant relationship between the amount of sulphur in the coal or coke or the gas oil and the organic sulphur in the gas. It is difficult to judge as to the relative effects of the coke and the gas oil in contributing organic sulphur to water gas, since comparisons must be made between different plants. In general, however, it appears that both will contribute to the organic sulphur.

Conclusion

In conclusion, the principal fact brought out by this survey is that organic sulphur in gas practically never exceeds the legal limit of 30 grains per 100 cubic feet. Under normal operating conditions and with the use of raw materials of normal sulphur content, it is doubtful whether this limit would ever be exceeded. The organic sulphur is not decreased to any appreciable extent while the gas is passing through the condensing, scrubbing and purifying system. The only notable exception to this is that fresh oxide will absorb some organic sulphur.

Appendix B

The removal of organic sulphur from gas. Various processes are discussed

By Alfred R. Powell

Forms of Sulphur in Gas:

Gas Purification has nearly always been considered as synonymous with hydrogen sulphide removal, but as coal and gas oil of increasing sulphur contents are used for the manufacture of gas, the other sulphur compounds must demand some attention. This problem has been considered by the Purification Committee during this year, and it appears to be of sufficient importance to present a brief review of processes designed to remove "organic sulphur" from gas, with special attention to processes worked out in this country and those particularly applicable to American gas practice.

Definition of Organic Sulphur

The term "organic sulphur" as applied to gas is generally used to designate all forms of sulphur other than hydrogen sulphide. As a matter of fact, carbon disulphide is the only sulphur compound other than hydrogen sulphide which occurs in comparatively large quantities, so that for all practical purposes the "organic sulphur" may be considered to be carbon disulphide. The small quantities of other organic compounds may be neglected from a quantitative standpoint.

In the majority of states where legislation has been passed regulating the quantity of total sulphur in gas, 30 grains per 100 cu. ft. has been set as the maximum. Assuming almost complete removal of hydrogen sulphide, the finished gas must always contain less than 30 grains of organic sulphur in order to conform to legal specifications. At the present time, the organic sulphur content of the gas in most cities is well below this maximum, as shown by the survey of several representative companies described and tabulated elsewhere in this report.

In several instances, however, organic sulphur has exceeded the maximum legal limit. This has provided the incentive to investigate methods for decreasing the organic sulphur in gas, and, in several cases, investigations have been carried on with the purpose of anticipating any organic sulphur troubles which might develop at a later date.

Conditions Leading to Formation of Carbon Disulphide in Gas

That carbon disulphide is not a primary distillation product of coal has been demonstrated in several ways. The mere fact that it is not found in gas from low temperature carbonization and that it is lower in vertical retort gas than in the gas from horizontal retorts, is sufficient to show that carbon disulphide results from secondary reactions after the gas is formed. Experiments have shown that gas containing hydrogen sulphide will react with incandescent carbon to form carbon disulphide up to a certain equilibrium concentration. The presence of carbon disulphide in gas is, therefore, probably due to

the reaction of hydrogen sulphide with incandescent carbon as the gas passes out of the retort.

In the case of water gas, a certain amount of carbon disulphide must be formed in the generator, since here we have conditions favoring its formation as the blue gas passes through the incandescent coke. The amount formed would be rather small, however, since the percentage of hydrogen sulphide is low and the percentage of hydrogen is rather high.

Formation of Carbon Disulphide

As to the formation of carbon disulphide in the carburetor, some interesting experiments along this line have been carried on by Stone and Webster in connection with the design of the Fall River gas plant.[1] Quoting from the paper describing this plant, the following statement is made:

"When using a high coke oil, a large part of the coke is deposited on the checker brick. During the run in which it is deposited, the coke is too cool to react with the hydrogen sulphide. If permitted to remain, however, it becomes incandescent during the succeeding blow and on the following run is active in the formation of carbon disulphide. It is, therefore, apparent that the only way to keep the fixed sulphur compounds down is to clean the coke from the carburetor after every run. In this manner the brick is clean at the beginning of each run and the hydrogen sulphide which is formed in the primary sulphur reaction cannot be reduced to carbon disulphide."

At this plant a connection has been made which "enables the generator to be isolated from the carburetor so that air may be admitted under the generator grate and to the top of the carburetor at the same time, the generator blast heating the fuel bed while the carburetor air consumes the carbon on the checker brick, thereby heating the brick."

It will be interesting to follow the results obtained from this type of installation as applied to the use of heavy, high sulphur gas oil. Without much doubt the organic sulphur problem in carburetted water gas manufacture will be affected more by the type of oil than by the coal or coke used. It does not require much argument to prove that practical methods for preventing the formation of undesirable constituents are preferable to methods for removal after they have been formed.

Processes for Removing Organic Sulphur from Gas

Various processes have been designed for the partial removal of organic sulphur from gas. No method has yet been devised which will completely remove organic sulphur, and it is very doubtful whether such a method is necessary, since part removal will decrease a high fixed sulphur content to within the legal limit.

The methods used for the removal of organic sulphur may be classed in four groups, (1) hot purification, of which there are several different processes, (2) washing by oil, (3) alkalinated cellulose, and (4) charcoal or other absorbent material.

(1) Hot Purification

Hot purification is generally dependent on the following reactions:

$$CS_2+2H_2=2H_2S+C.$$

It can readily be seen that this reaction is the exact reverse of that reaction which leads to the formation of carbon disulphide. The conditions must, therefore, be carefully regulated in order to obtain the maximum conversion of carbon disulphide into hydrogen sulphide. In general the temperature must be high enough to cause the conversion to take place at a reasonable rate and yet not high enough to cause the reaction to reverse.

The hot purification of gas on a commercial scale was first carried out at Portland, Oregon. The apparatus consisted of two vessels constructed much like water gas carburetors. While the checker brick in one vessel was being heated by producer gas to bring it to the necessary temperature, the other vessel, already hot, was purifying the gas passing through it. The hydrogen sulphide formed was removed by iron oxide. By using a temperature of 1200° F. about 70 per cent of the organic sulphur could be removed. The total cost of the process at that time was about one cent per 1000 cubic feet of gas.

First Used for Oil Gas Purification

This process was designed primarily for oil gas purification, but it was intended that the same principle could be applied to coal gas or water gas. Mr. E. L. Hall, General Superintendent of the Portland Gas and Coke Company, later took out a patent on an apparatus for the conversion of organic sulphur into hydrogen sulphide by means of a silent electric discharge, which was intended to supplant the hot purification. This was abandoned, however, and at the present time this company is changing over to an oil washing process. The advantages claimed for the oil washing process will be stated later.

The hot purification process just described depends solely on the effect of temperature to secure conversion of the carbon disulphide into hydrogen sulphide. Several other processes have been devised which make use of catalytic material to promote this conversion and are thereby enabled to operate at lower temperatures.

Carpenter-Evans Process

One of the best known of these is the so-called Carpenter-Evans process. The gas to be treated is heated to about 800° F., and is then passed over fire clay balls impregnated with nickel. The nickel catalyses the conversion of carbon disulphide into hydrogen sulphide, thus allowing a much lower working temperature. The catalyst soon becomes coated with carbon, so that it is necessary to burn this out at certain intervals.

The percentage of organic sulphur which can be removed by this process is said to be in the neighborhood of 70-80 per cent. The latest cost figures from England indicate that the cost of purification by the Carpenter-Evans process is about 1½ cents per 1000 cubic feet.

Rideal-Taylor Process

Another process somewhat similar to that of Carpenter and Evans, is the Rideal-Taylor process. In this later process, however, hydrogen is not used to secure the decomposition, but steam is introduced with the gas to cause the decomposition of carbon disulphide according to the following reaction.

$$CS_2+2H_2O=2H_2S+CO_2$$

This is quite a decided advantage over the Carpenter-Evans process in that no carbon is deposited which must later be burned out. Furthermore, the catalyst is somewhat cheaper in this process, since it consists simply of iron oxide mixed with a small amount of chromium oxide. However, no practical plant cost figures are available for the Rideal-Taylor process.

Several years ago, W. H. Fulweiler described a hot purification system used at Harrisburg. The catalyst in this case was a very active iron oxide and the temperature was about 450° F. The gas was preheated to this temperature after the hydrogen sulphide had been removed and before passing through the catalysing material. Gas containing about 40 grains of fixed sulphur was reduced to 9 grains. No cost figures have been given for this process.

(2) Washing by Oil

Within recent years a system has successfully been inaugurated at Halifax for decreasing the organic sulphur in gas. The process depends on the fact that 50 per cent or more of the organic sulphur may be removed from the gas by washing with paraffin oil. The oil may then be put in condition for further use by distilling out the dissolved carbon disulphide with steam.

The apparatus consists of a series of three steel towers filled with wooden grids. Fresh oil enters the last tower of the series and flows from this to the other two towers successively. The fouled oil from the first tower of the series is steam distilled in a tar still at a low temperature to remove the carbon disulphide.

Mr. Hamilton has very kindly furnished the committee the following comments on the process, based on recent experience.

Comments on Process

"Our experience has shown that the oil temperature should not be under 50° or over 60° F., and that in so far as possible the temperature of the oil should be maintained 1° or 2° below that of the gas with which it comes in contact. We have been able to accomplish that here by installing cooling coils between each of the three towers that we are using for oil scrubbing.

"The best reduction in sulphur for the least amount of oil appears to take place when we are using from eight to ten gallons of oil per 1000 cu. ft. of gas. We have also found that the method of handling the oil during its redistillation has considerable effect upon its absorptive capacity. Our experience has led us to believe that it is not best to attempt to strip all of the benzol from the oil during the redistillation process. We are now operating in such a way that we remove about 50% of the total benzol content of the oil at each distillation. With this benzol is driven off the major portion of the carbon bisulphide.

"These points cover our experience extending over three years of practically continuous operation with this system of purification. With twenty-four hour operation and careful temperature control it is possible to make reduction to approximately 50% of the organic sulphur present in the gas."

Portland Process

The Portland Gas and Coke Company has recently established a new process of oil gas manufacture in which the production of light oil is a prime consideration. Under these conditions they have found it profitable to establish an oil washing process for the double purpose of removing the light oil as well as the carbon disulphide. This is replacing the hot purification process originally used at Portland for the removal of organic sulphur.

Advantages of Process

Mr. E. L. Hall has the following to say regarding the advantage of this method:

"The removal of organic sulphur by this means is so closely associated with the methods and benefits derived from the recovery of light oil that it is practically inadvisable to undertake one without the other. A great many plants formerly producing light oil have not considered it profitable to do so under post war conditions, and I am convinced that the future will bring back a revival of this phase of by-product recovery, principally on account of the associated benefits, which I may enumerate as follows:

1. "Removal of benzol for sale as motor fuel or otherwise. An operation which is more or less self-sustained and the profits of which are essential towards defraying the cost of oil washing with a suitable oil, which has necessarily to be steam distilled.
2. "The removal of naphthalene, which is accomplished at no extra expense.
3. "The removal of 75% of the organic sulphur, which from present indications is entirely feasible.
4. "The elimination from the gas of certain hydrocarbons causing a gummy deposition on the meter valves.

"All of these advantages if properly weighed should bring about benefits sufficient to favor the benzol recovery, and it is my conviction that the organic sulphur will eventually be handled by this means, rather than by any other with which I am acquainted."

(3) Alkalinated Cellulose

The use of alkalinated cellulose for the removal of carbon disulphide from gas is often referred to as the "Athion" process. The alkalinated cellulose is

made by treating cellulose sulphite with soda lye. This material is spread on purifier grids, and the gas, free of hydrogen sulphide and carbon dioxide is passed through it. Removal of the carbon dioxide from the gas is effected by passing the gas through potassium carbonate before it goes through the alkalinated cellulose. The fouled material is essentially viscose which finds use in the manufacture of artificial silk, celluloid, etc. The inventors claim that alkalinated cellulose will cause a reduction in organic sulphur compounds of 75%, and that ten tons of the material will absorb 1¼ tons of carbon disulphide.

It is very improbable that this process will find use in this country. The necessity for the removal of the carbon dioxide is a big factor, and would probably make the cost prohibitive without any further costs. The purifying material itself would be expensive, and it is very doubtful whether the quality of the by-product, viscose, would be high enough to offset any of the costs.

(4) Charcoal or Other Absorbent Material

Charcoal will absorb approximately 65 volumes of sulphur compounds from gas, whereas the volume of other gas constituents absorbed is much smaller. Gordon Adams has patented a process based on this fact. After the gas has passed the boxes, it goes through animal or wood charcoal in a granulated form. The quantity of charcoal used must be just sufficient to be saturated with sulphur compounds and naphthalene and not too large a quantity since this leads to excessive loss of unsaturated hydrocarbons. This will vary to a considerable extent but 70 lbs. of charcoal per ton of coal carbonized has been taken as a figure representative of coal gas. The charcoal is regenerated for further use by heating to about 300° C. No practical operating tests of the absorbent method for removing carbon disulphide from gas have been carried out in this country

Summary and Conclusions

1. Although the organic sulphur in manufactured gas generally is well below the legal limit, in some cases this limit has been exceeded. As coal and gas oil of higher sulphur contents are used, it may be necessary for gas companies to adopt means for decreasing this constituent.

2. The organic or fixed sulphur of gas consists very largely of carbon disulphide, and any process designed to decrease organic sulphur must be so arranged as to remove this constituent.

3. In the case of carburretted water gas, one American plant using high sulphur gas oil has been designed to handle the organic sulphur problem by burning out the carbon deposited in the carburetor at frequent intervals. Since carbon disulphide is formed by the action of hydrogen sulphide on incandescent carbon, this procedure should be a step in the right direction.

4. Several hot purification methods have been developed on a practical scale, both in this country and in England for the purpose of reconverting the organic sulphur of the gas into hydrogen sulphide, which may then be removed by ordinary methods. Among the outstanding processes of this type are the Oregon process, which uses hot checker brick, the U. G. I. Process developed at Harrisburg, which uses active iron oxide at a temperature of about 450° F., the Carpenter-Evans process, which uses nickel at a temperature of about 800° F., and the Rideal-Taylor process, which uses steam and a catalyst composed of iron oxide and chromium oxide.

5. An oil washing process has been developed at Halifax, which has given satisfactory results for the conditions existing there over a period of three years. Also an oil washing process is being installed at Portland, Oregon, for use on oil gas.

6. Several other processes of rather doubtful commercial application have been developed in other countries. These have been briefly described in this report.

Sales Organization and Proper Water Heater Installations

Importance of correct installation—Descriptions of proper and improper connections

G. C. Carnahan

Manager, Heating Division, The Peoples Gas Light & Coke Co., Chicago, Ill.

This paper was read before the Thursday meeting of the Commercial Section of the American Gas Association, assembled in Convention at Atlantic City.

IT is generally conceded by Gas Companies that Gas Fired Water Heaters for domestic use increase the sales of gas to a very large degree. It seems logical, therefore, that every consideration should be given to ways and means that will bring about increased water heater sales.

A great deal has been said and written concerning the getting of orders. Sales Departments of most gas companies have reached a fairly high state of efficiency in selling the heaters that are best adapted to existing conditions and in furnishing the service required; but this is only one step in the making of a really satisfactory sale. Unless the heater remains sold, the primary effort is wasted. Since the main object of the Gas Company is to sell gas, the heater must remain satisfactory, and this can only be possible when the Installation and Mainte-

nance Departments are brought up to the same high standard of efficiency that now exists in the sales Department.

Importance of Proper Installation

The importance of proper installations, adjustments, and maintenance cannot be emphasized too strongly nor too often. This branch of the business is often in charge of men who have no means of knowing that certain practices will lead to unsatisfactory operation, or high gas bills, because after the heater is installed, they never see or hear of it again. It is only when all branches of the business are under one central organization that the benefit of experience with heaters in operation can be put to use by all for the betterment of service to our customers. The sales manager should be personally conversant with the deficiencies of the heaters in use, and this knowledge can only be obtained thre contact with the Maintenance Department. He must also be in active touch with the Installation Department, as at least 75 per cent of the causes of unsatisfactory service and high operation cost are due to improper installations and adjustments rather than to any defect in the appliance itself.

Common Errors of Installation

It is the purpose of this paper to outline some of the most common errors that are constantly made, with a view to influencing the better education of men in the Installation and Maintenance Departments to do their work more efficiently, so that water heaters we sell will be sure to have a fair chance to give the customer satisfactory service. Satisfied customers augment pleasant business relations and influence the general public favorably with regard to the use of gas for water heating.

The importance of proper installations and adjustments is the same to the customer whether he purchases a tank heater or the most expensive instantaneous or storage system, for in either case, the object is to obtain

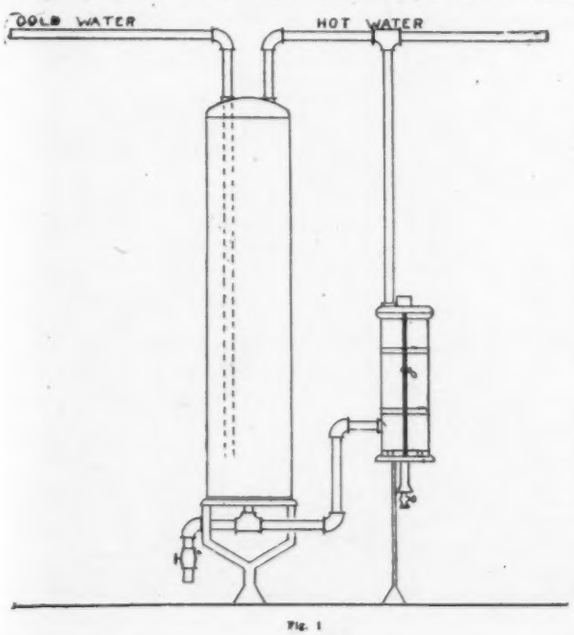

Fig. 1

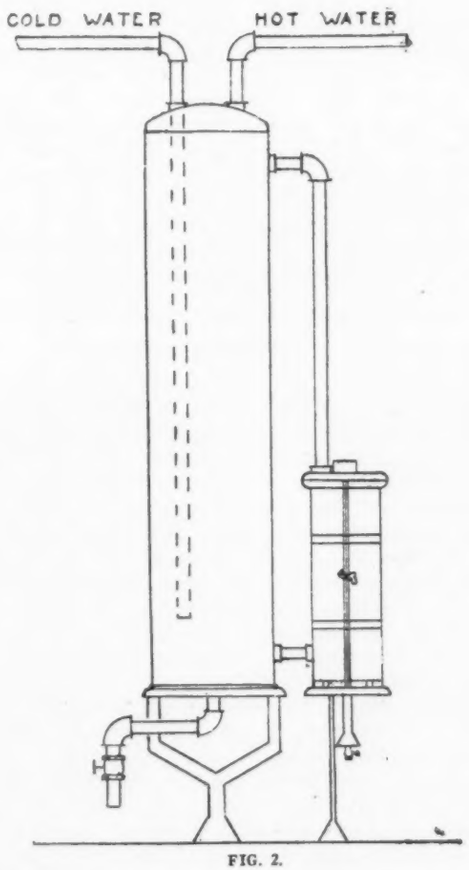

FIG. 2.

adequate hot water service. The utmost care should be exercised, regardless of the size or type of appliances sold.

Tank Heater

The tank heater is the one that we sell in greatest numbers; therefore, we will give it first consideration. Connecting the tank heater may seem a simple task, but there are thousands of these heaters in use which are not giving the service they should, or could, if installations were properly made. For many years, it was only considered necessary, in making the water connections, to connect from the bottom of the tank to the lower connection on the heater, and from the top of the heater to the hot water outlet from the top of the tank leading to the fixtures. Many connections which were made in this manner, as illustrated in Figure 1, were not satisfactory. The customer did not always get water as hot as he would like to have it, and undoubtedly decided that he could not expect any better results from a gas heater.

How Wrong Connection Works

This is what really occurs when connections are made in the manner described above. When water is drawn from hot water line, part of the water enters the line from the top of the tank and some of its comes from the bottom, around through the heater connection. If the heater is not burning at the time, this water would be cold and the cause would be that the water running

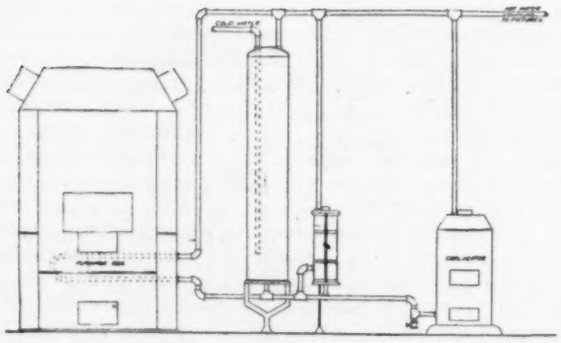

Fig. 3

from the faucet is always lower in temperature than that in the top of the tank. This is most marked when the heater is not operating and always exists in varying degrees when the hot water circulating line connects direct to the hot water line leading from the tank. Another important feature that developed in a connection, as shown in Figure 1, was that the cold water circulating line filled with sediment in localities where the water supply was from lakes or rivers. This condition soon manifested itself in the form of very hot water or even steam at the top of the tank and a hammering of the coil. With the introduction of tank couplings, a connection that eliminated both by-passing and sediment in the cold water circulation was possible. (See Figure 2.)

In this type of installation, there is no direct connection between the circulation lines of the heater and the hot water outlet from the tank. Therefore, by-passing through the heater is impossible and if the tank is flushed out frequently, the heater will be kept reasonably free from mud and gravel.

Furnace oil, water back, or coal heater connections to a tank, on which a gas heater is used, are sure to give trouble when the hot water circulator is connected direct to the hot water outlet of the tank. When these auxiliary attachments are not in use, they allow cold water to flow into the hot water line.

Auxiliary Connections

Figure 3 shows a type of installation we sometimes find where the customer complains that he can never get hot water, no matter how long he burns the gas. Either the coal heater connection, or the furnace coils would prevent his getting hot water if they were not being heated.

Back circulation is also sure to result if all the appliances are not fired when connections are made as shown in Figure 3.

The position of the heater on the tank is also important. It should not be too high, and all the connections should be full size of opening on heater with a minimum number of fittings. Piping should be reamed to permit freedom of circulation.

One other common connection, where cold water is by-passed into the hot water line, is through a return circulation line. Many circulation systems are not equipped with check valves and when water is drawn from a hot water faucet, it is supplied through the hot water line with hot water from the tank and with cold water through the return. The result is a supply of warm water from the hot water faucets. A swing check allows the water to circulate but prevents a backward flow through the return.

Draft Connection

Tank heaters, as well as all other gas water heaters, should have a flue with a draft hood connected to the chimney. Draft hoods were designed originally to protect pilot lights in the automatic heaters, but their value as a draft regulator is now well recognized. Too much draft is as undesirable as too little, and this is especially true of the tank heater. Excessive draft lowers the efficiency and often causes flashing by pulling excess primary air through the mixer which may induce back circulation by the lowering of the temperature in the coils when the heater is not lighted.

Figure 4 shows the effects of varying draft conditions on a tank heater connected to a chimney with and without draft hood in the flue pipe. It will be noted that when a draft hood is used, approximately the same efficiency prevails under all possible conditions from a

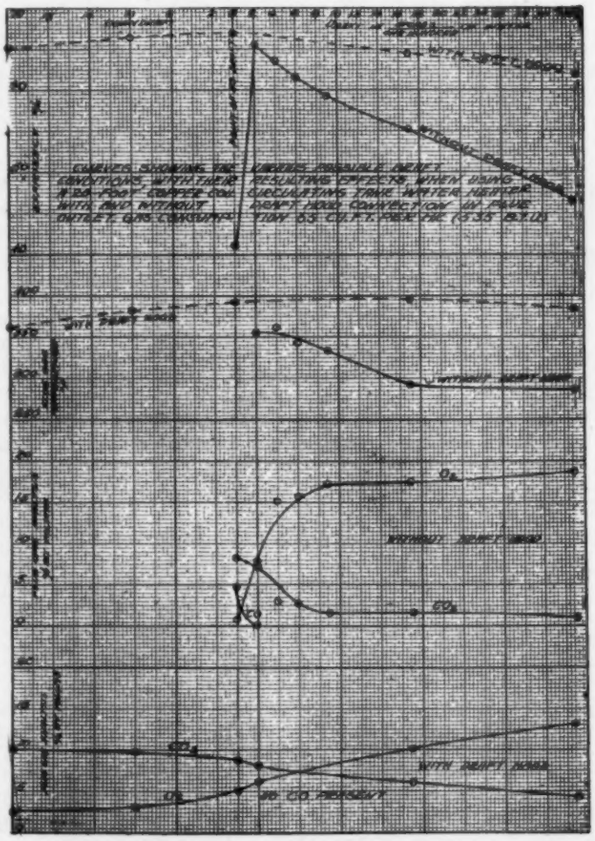

Fig. 4

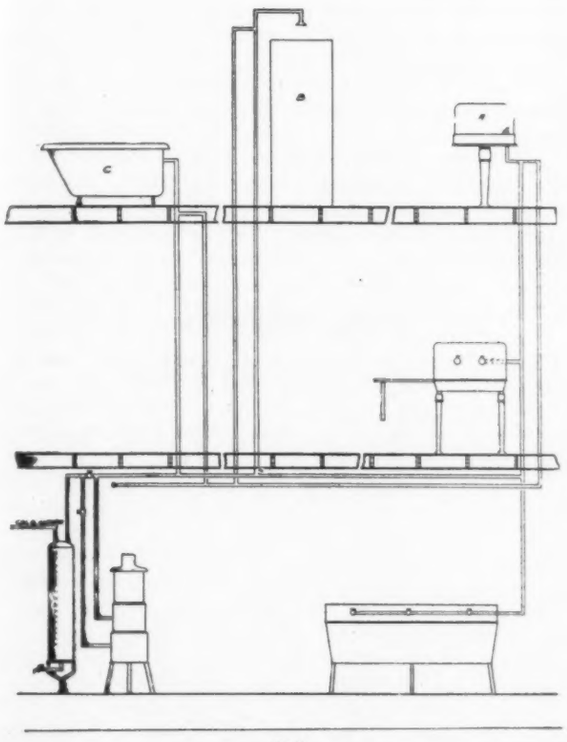

Fig. 5

down draft to an excessive up-draft; while, without a draft hood, it is only under ideal conditions that the maximum efficiency is obtained. Where there is no draft at all, or a slight down draft, a very dangerous condition develops in a heater not equipped with a draft hood. Large amounts of carbon monoxide are produced and thrown into the room and the efficiency of the heater is reduced.

Importance of Draft

It is generally considered that a chimney which extends above the roof, showing a draft when tested with a piece of burning paper, will serve all the requirements of any type of gas water heater. This supposition is far from correct. The chimney may not extend far enough above the highest point of the roof or adjoining building to prevent down draft when the wind is from certain directions. If the chimney has no other heating appliance connected to it, except a gas or water heater, which has intermittent operation, there may not be any movement of air in the chimney at certain times, and the temperature of the flue gases from a highly efficient water heater may be insufficient to create necessary draft before carbon-monoxide is produced in the heater and escapes in the room.

If the chimney has been previously used with a bituminous coal burning appliance, large quantities of soot and ashes will adhere to the walls, and the moisture, resulting from the condensation of the flue gases, will saturate this material, which adds to its weight and causes it to fall, and in many cases, block the chimney entirely.

In a well-constructed building, where all the doors and windows are closed tight, as is the case in the winter time, if two chimneys extend from the same room, the chimney that is continuously heated, as with a furnace, may cause a down draft in the chimney that is intermittently heated by a gas water heater, resulting in all the evils of a down draft; such as the production of carbon monoxide, gas burning outside the heater, etc.

It is proved, by the experimental data shown in Figure 4, that the use of a proper draft hood maintains the most suitable draft condition, and prevents undesirable and dangerous effects that may result in varying draft conditions.

Installation of Automatic Water Heaters

The application of the proper thought and care to the installation of an automatic or storage system should begin the moment the heater is uncrated on the customer's premises. The placing of the heater in a position best suited to the location of a good chimney and to the location of the fixtures to be supplied, is the first important step. The heater must be connected to a chimney that will provide proper draft without interfering with the other appliances and must be sufficiently close to avoid destruction by condensation.

In older houses, extra chimneys are available and it is regrettable that this condition does not prevail in newer homes, as it must be admitted that connecting a flue larger han 4 in. into a chimney with a furnace or boiler flue, especially if it is of the down-draft type, affects the draft. Draft being created by temperature, the introduction of cold air through the water heater flue produces the same effect as a check damper and the connecting of the heater flue above the furnace flue seems to be more detrimental than connecting below. Water heater flue pipes should never be connected with small metal vent pipes or ventilating system, and should never be run outside of the building, even though extended above the roof, unless they are insulated or built of material that has an insulating wall, for otherwise it is impossible to maintain the necessary difference in temperature in the flue used with a water heater of high efficiency and intermittent operation.

Size of Pipes Important

Hot water must be delivered to the faucets with the least delay and at the lowest cost. Long and oversized hot water lines have an important bearing on this matter. The following table shows the number of feet of various sizes of piping that will contain one gallon of water:

100.8 ft. of	⅜	in. pipe contains a gallon.
63. ft. of	½	in. pipe contains a gallon.
36.1 ft. of	¾	in. pipe contains a gallon.
22.3 ft. of	1	in. pipe contains a gallon.
12.8 ft. of	1¼	in. pipe contains a gallon.
9.4 ft. of	1½	in. pipe contains a gallon.

On ordinary residence installations where most of the faucet tailpieces are ⅜ in. and ¼ in., it is seldom necessary to use a larger hot water delivery line that ¾ in. If an ordinary range boiler is in use, it must be remembered that the smaller sizes have ½ in. cold water dip pipe and the larger ¾ in, which affects the amount of

water flow regardless of the size of the lines to the fixtures. A ¾ in. pipe of equivalent length of 100 ft. figuring a T equal in resistance to 4 ft. of length, and each all at 2 ft. of length will pass six gallons of water per minute with a loss of about 4½ lbs. pressure. A ½ in. pipe 50 feet in length, figuring in the average number of ells and T's will pass up to four gallons per minute without an excessive drop in pressure. In some cases, even ⅜ in. pipe will pass sufficient water to provide an adequate supply at lavatory faucets.

It is plain to be seen where water is not circulated, that the smaller the hot water delivery line, the shorter will be the wait for the hot water, and a corresponding smaller amount of water will be left in the delivery line to be lost by cooling. Hot water lines should be as small as possible and yet provide an adequate flow at all fixtures. These sizes will vary in different cities, depending on existing water pressure and the possibility of the presence of rust and sediment.

Advantages of Small Hot Water Piping

Changing a 1" delivery line 50 ft. in length to a ¾" hase the same effect as moving the heater 19 ft. nearer the hot water fixtures and reduces the amount of water contained in the line about .86 of a gallon, while changing 50 feet of ¾" pipe to ½" has the same effect as moving the heater 21.5 feet nearer to the fixtures and reduces the water in the line .59 of a gallon. Locating the water heater as near to the fixtures as all conditions will permit is always imperative, but many water lines are much too large for economical and satisfactory service. To accomplish the desired result, return lines, which are already installed, may be used to advantage. They are often used one size smaller than the hot water delivery line and by converting the basement portion of the return to a hot water delivery line, a more satisfactory installation can be made at very little expense. In and event, oversize water lines should be changed, for the expense incurred will be saved many times by reducing the gas bill.

Circulating System

It will be noted that this paper deals principally with the installation of water heater for domestic use, and on such jobs we encounter both the circulating and direct hot water delivery systems. As is well known, the purpose of a circulating system is to maintain hot water at the faucet, eliminating the necessity of emptying the pipe between heater and faucet. This is quite essential in large buildings where the runs of pipe are long or in cases where cistern water is used and it is desirable to conserve the supply.

Water can be circulated with an automatic storage system the same as with any other tank system, and can also be circulated with the automatic instantaneous heater by the use of a booster attachment, but in the average size residences, the direct system is preferable because of the greater economy of operation. Its only disadvantage is the short wait, and as most of the hot water is used at certain periods of the day, for an hour or so, each individual does not have to empty the line.

From the above figures, it is evident that where hot water is stored in the tank or circulated to provide the proper service, the loss in radiation should be reduced to the minimum by insulating all exposed piping on old jobs, and the entire hot water and return line on new work, as well as the tank. When an automatic heater of either type is installed and the circulating line is to be discontinued, the mere valving or cutting off near the tank is not sufficient, if there is a separate water flow and return line to each fixture.

Faulty Installations

Figure 5 represents an installation in which an instantaneous heater was installed in connection with a tempering tank, equipped with a return circulator which was cut off at the tank. When hot water is drawn at any faucet; say for example (a) water will leave the heater and travel direct through hot line towards this faucet but some will go up line toward faucet B, back down the return line and backward through the main return to A. Hot water will also pass up the hot water line to C and back down this branch of the return to the main return line and travel toward faucet A. With the indicated method of cutting off the return, hot water cannot be drawn at any of the faucets, at the temperature it leaves the heater, without flushing all branches of the hot aud return lines. This has two distinct disadvantages. It delays the service by increasing the length of time for hot water to arrive at the fixtures and also increases the expense of operation, due to the increased amount of hot water that remains in the piping to cool off after each time hot water is used.

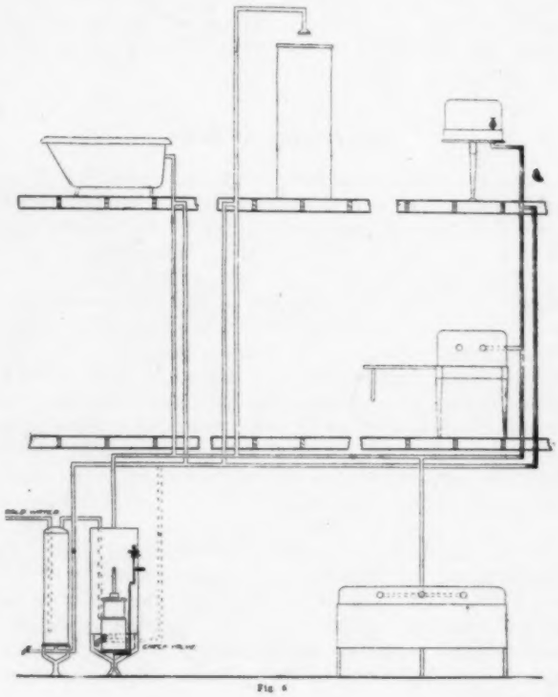

Fig. 5

To prevent this waste and delay, each branch of the return line must be valved or cut off. This applies to both instantaneous automatic and automatic storage heater connections.

Another faulty installation that results in all the evils heretofore described, is illustrated in Figure 6. You will note that the automatic storage system has been installed without disturbing the return line, where it is connected to the old tank. This will also result in keeping both tanks hot. If it is necessary to circulate water, the return should be connected to the new system, by using a check valve, and if it is to be discontinued, the practice recommended in connection with Figure 5 should be employed.

Overhead Circulating System

Another common method of installing a return circulating system is to run the hot water line from the tank up through the building, supplying the various fixtures, and make the kitchen sink the last fixture on the return to the tank; the theory being that the kitchen sink having frequent use will keep the line alive and stimulate circulation. In this case, if the return is cut off at the tank, it will be necessary to empty the entire hot water piping to get water at the kitchen. To avoid this, the return should be cut off ahead of the kitchen sink and the return line connected into the hot water line at the tank, which will supply the sink direct through the return line. If there are other fixtures, that would be affected, it is sometimes desirable to cut the line in the attic, or wherever it may be reached, so that hot water can be supplied to the fixtures by the most direct route.

Use of Tempering Tanks With Automatic Water Heaters

When a new heater is to be installed in an old house, the customer invariably asks what will be done with the water heating system in use. It has been the practice, in some localities, to remove all of the old equipment, including the tank. This, I believe, to be a bad practice, especially in relation to the tank. There is nothing to be gained by removing the tank but there is a great advantage in using it. It is desirable to install a tempering tank in a new home even if an automatic storage system is to be installed, as the cost of the tank will be saved many times over by the reduction in the gas bill.

Almost every one familiar with the sale and installation of automatic heaters knows what is meant by a tempering tank; it is simply a reservoir through which the water flows before entering the automatic, and applies to either type of system. Many of us do not stop to sum up the full benefits of such an arrangement. In all northern cities, the cold water is fed into homes far below basement temperature. This cold water in a tempering tank will absorb heat from the surrounding air at a rate sufficient to reach the room temperature in about eight hours. If the temperature of the incoming water is 38° F., as it is in Chicago in the winter, and a 40-gallon tempering tank is used in a basement that is 75° F., the inlet water is warmed 37° F. at no cost whatever. If the temperature of the water is to be 140° F., then a theoretical saving of 35% of the gas bill would be effected by the use of this tempering tank, where less than 120 gallons of water a day are drawn. Of course, the cold water does not always reach room temperature when water in large amounts is used in a short time, but it is safe to say, that in cities of climatic conditions and cold water supply similar to Chicago, a tempering tank of adequate size will save approximately 25% of the operating expense for at least six months of the year.

Advantages of Tempering Tank

Another marked benefit of the tempering tank is its service as a settling chamber. It keeps large quantities of suspended matter, such as mud, sand and gravel, from getting into the heating element of a storage system. This is especially desirable when a system is used where the heat is applied directly to the bottom of the tank. In some types, it is impossible to remove all of the mud through the sediment cock. In any event, it is seldom done, due to the negligence of the owner, and the mud and sediment serve as an insulator that confines the heat to the metal with detrimental results. When used in connection with an automatic heater, this suspended matter is kept from entering the water valve, thus eliminating sticking and prolonging the life by reducing the wear.

Relief Valves for Safety

From a standpoint of safety, in all cases where water is heated in a storage tank, regardless of the kind or type of heater employed, a properly located relief valve should be used, where there is a water meter, check valve, or any other device that would impede relief of excessive pressure by preventing the hot water from backing up in the cold water line.

According to the laws of physics, water expands with an increase in temperature above 39° F. For example, 100 gallons of water at 40° F. when increased in temperature to 140° will increase in volume 1.7 gallons. Since water is practically incompressible, if there is no means of taking care of this increased volume, an enormous pressure will build up in quantity sufficient to rupture the tank or fittings, and if a temperature above the boiling point is reached, a very serious explosion could result.

The final step in making an installation which will be satisfactory to the customer and which will enable the heater to perform the service expected of it, is proper adjustment. It has been proven that water heaters are most efficient when burning a certain amount of gas. Therefore, first make the proper gas adjustment. This will vary, depending on the quality of gas supplied. With an instantaneous heater, the water flow must also be regulated to obtain the desired temperature. The original thermostatic adjustment made at the factory seldom requires changing, but it can be changed, if necessary, to meet requirements.

A relatively low efficiency results on both high and low consumption. This confines the contention that graduated thermostats, when used with circulating heaters, do not permit the heater to give the most economical service except a small part of the time,

as they are constantly changing the gas flow to and from the point of highest efficiency.

Member companies of the American Gas Association are urged to give careful attention to the correct installation of water heating equipment. The best gas, sold at the most attractive price, can be made of little value to customers if appliances do not operate satisfactorily.

If the customer is unable to obtain satisfactory results from the use of his water heater, he is likely to blame the quality of gas supplied, or to believe that the appliance is defective. If, on the other hand, we follow up our installations with inspections to make sure that the heater is connected so that it can operate at the maximum possible efficiency, we are rendering a courteous service that will be appreciated and at the same time adding a booster for the use of gas as fuel for water heating.

Customers' Accounting

Report of 1923 Committee
Costs—Bookkeeping without books—Merchandise accounting

This report was read before the Thursday Meeting of the Accounting Section of the American Gas Association, assembled in convention at Atlantic City.

W. A. Doering, *Chairman*, Boston Consolidated Gas Co., Boston, Mass.

YOUR COMMITTEE on Customer's Accounting was organized as outlined at the first meeting of the Managing Committee, to take last year's work as a basis and attempt to present to the industry definite recommendations as to possible economies by,

(a) Taking typical companies in various parts of the country and reducing their results to a comparable cost basis. All costs to be considered confidential and published under a key. The Committee's report to contain an analysis of these figures and a discussion of any special conditions affecting them.

(b) To keep in touch with the development of the so-called Baltimore System of Bookkeeping without Books through its adoption by other companies, notably the Public Service Company of Northern Illinois, etc. As this system includes the most progressive innovations designed for economies its successful use by other companies will be one means of keeping such economies before the industry.

(c) To go further into the subject of merchandise accounting.

For the purpose of carrying on these three activities the following sub-committees were appointed:

Sub-Committee on Costs
Sub-Committee on System of Bookkeeping without Books.
Sub-Committee on Merchandise Accounting

These Committees have met and have prepared their reports which are appended herewith.

An additional activity was assigned to this Committee under the chairmanship of Mr. Paul D. Warren, to be known as the Sub-Committee on Exhibit. This Sub-Committee has prepared and has charge of the Accounting Section exhibition at the Convention. A great deal of credit is to be given to Mr. Warren for the good work which he has accomplished.

Sub-Committee on Costs

This Committee was very ably handled by Mr. W. G. Murfit without assistance and a great deal of credit should be given him for the very able and voluminous report which he has submitted. This report undoubtedly will be of great assistance to the industry as a whole.

Sub-Committee on System of Bookkeeping Without Books

In view of the fact that this system represents the most economical method proposed to date of handling customers' accounts, and that its general adoption has only been prevented by considerations of its adaptability to all local conditions, etc., it was decided that the function of this sub-committee would be to keep in close touch with those companies that have adopted this system and to present the following information relating to their individual experiences with it:

(a) Actual savings effected as compared with system formerly in use.
(b) Difficulties, if any, experienced in its introduction or operation.
(c) Any modifications introduced in the original system as it is applied in Baltimore because of such difficulties or to take care of special local conditions.

This Committee under the chairmanship of Mr. W. H. Cassell has presented herewith a very able report from the very meagre information obtainable on the progress made by the Public Utility Companies along the lines of Bookkeeping without Books. As it is pointed out in their report, no attempt was made to secure the actual savings effected by the installation of this system. As stated by the chairman of this committee in his report, some method of keeping the Accounting Section apprized of the various companies adopting this method of bookkeeping should be devised. The Customers' Accounting Committee certainly recommend that the Managing Committee of next year keep this in mind.

Sub-Committee on Merchandise Accounting

This Committee under the chairmanship of Mr. Keller has also done a very excellent piece of work and has presented descriptions of Merchandise Accounting Systems of various companies. While they are not

presenting these systems as typical or ideal systems, they are, nevertheless, the very latest obtainable.

During the year your Committee has been of assistance to various companies, answering inquiries in reference to the report of the previous year.

A complete description of a Machine Bookkeeping System was sent to your Committee from the Portland, Oregon, Company. This description was published in the A. G. A. Monthly, and is also included as an appendix to this report.

In conclusion, while it was suggested that this Committee should finish up its work in the present year, the Committee does not feel that it would be wise to discontinue the work entirely, but recommends to the Managing Committee that a Customers' Accounting Committee be appointed in the coming year to keep in touch with, and advise the Managing Committee, as to the adoption by the various utilities of the system of Bookkeeping without Books; also as to the progress made in new installations of Merchandise Accounting. As the Merchandise Accounting will undoubtedly be one of our biggest problems, we consider it wise to keep in touch with its latest development, especially, as to accounting of the partial payment accounts.

Respectfully submitted,

W. A. Doering, *Chairman;* W. H. Cassell, Thomas R. Clayton, DeWitt Clinton, J. R. Fenniman, H. F. Frey, H. F. Hutcheson, A. R. Keller, Adam Kurtz, W. G. Murfit, Otto Price, L. E. Sanderson, H. C. Schaper, P. D. Warren, A. A. Wilbur.

(The main body of this report is not published here for want of space. The complete report can be found in the proceedings of the American Gas Association, Editor).

Report of 1923 Chemical Committee

Discussion of work of sub-committees—New subjects suggested

* *A. C. Feldner, Chairman*
Bureau of Mines, Pittsburgh, Pa.

This report was read before the Thursday meeting of the Technical Section of the American Gas Association, assembled in convention at Atlantic City.

THE 1923 Chemical Convention, consisting of 24 members, was organized in January, held its first meeting in New York on February 9, second meeting in Chicago, Ill., on March 13, and the third and final meeting at Atlantic City, N. J., on June 27.

All meetings were well attended. The second and third meetings were held jointly with the Committee on Purification and the Committee on Deposits in Gas Pipes and Meters, the latter two committees being under the general supervision of the Chemical Committee.

Committee on Deposits in Gas Pipes and Meters, R. L. Brown, Chairman

The Committee on Deposit in Gas Pipes and Meters has carried on, in co-operation with the U. S. Bureau of Mines, fundamental research on the nature, formation, and prevention of gummy deposits. Several papers have been published during the year, and a comprehensive progress report will be presented at this meeting by the Chairman. In carrying out this investigation, the U. S. Bureau of Mines contributed the services of Dr. R. L. Brown, organic chemist, one assistant chemist and laboratory facilities of the Pittsburgh Experiment Station. The American Gas Association paid the salary of one assistant chemist and the traveling and other expenses of the men engaged on the work; and some of the member companies contributed services of their staff and equipment in making tests at gas plants.

As the chemistry of the highly complex organic compounds entering into gum formation is but little known, the committee has been obliged to devote much of its energy to a study of the chemistry of these substances in order to determine their composition and reaction. A full knowledge of these properties is a necessary prerequisite for solving the gummy deposit problem. It is hoped that work on this subject can be continued for another year, when it is believed a fairly complete solution to the problem will have been obtained.

Committee on Purification, A. R. Powell, Chairman

The report of the Purification Committee will be presented separately by the Chairman, Dr. A. R. Powell.

Sub-Committee on Air Needed for Revivification in Situ in Purification, J. F. Wing, Chairman

The report of the sub-committee on "Air needed for revivification of iron oxide in situ" is included in the report of the Deposits Committee, as the investigation was suggested in connection with the reduction of gum deposit trouble by reducing the oxygen content of gas to the minimum requirement for revivification of iron oxide. Tests at five different gas plants showed that under all the conditions existing at the time of the tests, considerably less admitted air would have served the purpose desired and less surplus oxygen would have passed on to react with the unsaturates to form gums in the meters.

Sub-Committee on Editing the Gas Chemists' Handbook, E. C. Uhlig, Chairman

The sub-committee on editing the Gas Chemists' Handbook, E. C. Uhlig, Chairman, C. C. Tutweiler and O. A. Morhaus, was continued as a standing committee to take charge of the revision of the Gas Chemists' Handbook. The changes in methods recommended by the various sub-committees on co-operative tests of methods, after approval by the Chemical Committee, are ta be incorporated in the next revised edition of the handbook. Through co-operative analyses of carefully prepared samples each section of the book is to be critically tested. In

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1921 and 1922 the chapters on gas coal and coke were thoroughly tried out by analysis of standard samples. During the present year co-operative analyses have been undertaken on ammonia liquor and materials by a sub-committee under the chairmanship of C. H. Stone, and on tests and analyses of iron oxides by W. A. Dunkley.

Analyses of Light Oils

A third sub-committee, appointed this year, on co-operative analyses of light oils and tars, Dr. J. M. Weiss, chairman, did not send out any standard samples because the samples of the other two committees were more than enough to keep the various co-operating laboratories busy. Dr. Weiss' sub-committee has submitted a report on revisions suggested by progress in testing methods since the Gas Chemists' Handbook was last revised.

Ammonia Methods

The complete reports of these sub-committees are given as appendices of this reort. Special attention is called to the valuable work of the sub-committee on ammonia methods. With no precedent to guide them Mr. Stone and his committee worked out the difficult details of preparing and shipping these standards so that they reached the cooperating laboratories in good condition. The Chemical Committee is greatly indebted to them for the no small amount of time and labor they devoted to this task.

The results of the analyses and the criticisms of the co-operating laboratories show that the ammonia chapter of the handbook needs extended revision, and the sub-committee has been requested to prepare and present with their report a complete revision of the ammonia chapter.

Mr. Dunkley's committee sent out eight samples of oxides, four used and four unused, to ten different laboratories. Results were obtained from eight laboratories. The comparative tests showed that certain modifications of the methods of the handbook are needed, and that some of the laboratories did not give adequate attention to important details in carrying out the methods, due, perhaps, to the infrequency of using these tests. The sub-committee recommends more work on revising these methods and on educating the laboratories to more careful analytical work.

Gas Oil Testing

The sub-committee on Testing and Valuation of Gas Oils, C. A. Lunn, chairman, has continued its work from las year on (1) studying laboratory gasification apparatus wherein gas oil is subjected to cracking in an atmosphere of blue gas under controlled conditions and resultant products measured; (2) Has cooperated with the A. S. T. M. in the formulation of standard methods for testing gas oils. Cooperative tests on three samples of petroleum by five gas company laboratories have shown that the results obtained with laboratory gasification apparatus are subject to wide variation, although it appears that the individual companies obtained results of relative value on their own machines.

Standardization of Laboratory Apparatus

The sub-committee recommends further study of standardization of laboratory gasification apparatus. The cooperative work with Sub-committee D-2 on Petroleum Products and Lubricants of the American Society for Testing Materials has resulted in the adoption of tentative standard methods for testing gas oils. These methods are given in Appendix D of this report.

In closing the brief review of the work of the sub-committees on cooperative analyses, the chemical committee desires to strongly emphasize the importance of this work and to urge every member laboratory to take part in analyzing these samples and in criticizing the methods. The value of this research is twofold: First, information is obtained on the accuracy and general suitability of the methods, and second, the participating laboratories discover the accuracy or lack of accuracy of the work done in their own laboratory.

Unfinished Problems

It is obviously impossible to complete the problems of each annual chemical committee in the relatively short space of time available between the organization and the date set for the convention reports. The more important problems require continuous work through several years to accomplish results of value to the industry. It is therefore recommended that the next chemical committee concontinue work on the following important subjects:

Suggested Subjects

1. Research in cooperation with the U. S. Bureau of Mines on the nature, formation and prevention of gummy deposits in gas pipes and meters should be continued. Much has been accomplished in the past two years and another year should complete the problem.

2. The sub-committee on gas purification should continue research on the correlation of laboratory tests of iron oxide with plant experience; and should report on progress in liquid purification.

3. The testing and improvement of methods of the Gas Chemists' Handbook should be continued until every chapter has been covered so that the next edition may be thoroughly revised in accordance with the best practice. The personnel of the present sub-committee on cooperative analysis of ammonia liquor should be continued and requested to again send out standard samples for testing by the revised methods. The work of the sub-committee on cooperative analysis and testing of iron oxides must also be continued to completion of satisfactory revised methods.

The sub-committee on testing and analysis of light oils and tars should continue with the same personnel if possible and should be requested to prepare and send out standard samples, for tests.

And, finally, the general sub-committee on Revision of The Gas Chemists' Handbook as outlined in the minutes of the Chemical Committee meeting of February 9, 1923, should be reappointed and requested to actively follow up the program of revision.

REPORT OF SUB-COMMITTEE ON COOPERATIVE TESTS OF AMMONIA LIQUORS

Chapter 2, Part 2, Gas Chemists' Handbook

C. H. Stone, Chairman,
Rochester Gas & Electric Corp'n, Rochester, N. Y.

The committee was appointed on February 9, and on February 15, a proposed plan for cooperative tests of ammonia methods was sent to each member of the sub-committee and to the Chairman of the Chemical Committee for their approval or criticisms. This plan seemed satisfactory to all concerned. A very careful scheme of sampling was worked out whereby it was hoped that all the samples would be absolutely uniform. On March 30, Prof. Wilson and the writer supervised the taking of these samples at the works of the Rochester Gas and Electric Corp. This applies to all except the samples of sulphate which were sent here in bulk by Prof. Wilson and sampled here. Every one of the samples was analyzed before leaving the laboratory and no sample was sent out which varied from the others by more than the limits of experimental error.

Meanwhile, on March 20, a letter was sent to a number of gas companies and others interested in the ammonia business, asking for their cooperation. A total of fifteen laboratories finally agreed to analyze the samples and the names of these are as follows: Henry Bower Chemical Co., Consolidated Laboratories of N. Y., Camden Coke Co., Laclede Gas Light Co., Stillwell and Gladding, Chicago By-Product Coke Co., Clairton By-Product Coke Works, United Gas Improvement Co., C. H. Tenney & Co., Rochester Gas and Electric Corporation, Milwaukee Gas Light Co., Bureau of Mines, Seaboard By-Product Coke Co., Solvay Process Co., and New Haven Gas Light Co. On May 1, the samples were shipped to the participating companies. The delay between sampling and shipment was due to the large amount of time necessary for analyzing each of the ninety samples. A letter accompanying the shipment requested that the methods in the Gas Chemists Handbook be strictly followed but that any methods of their own be also tried and the methods and results reported. A small bottle of standard acid accompanied each shipment whereby the analyst could check his own acid. All results were to be reported in terms of the standard furnished, and thus no errors due to standardizing the acid could be attributed to the methods in the handbook. The results of these analyses did not come in as rapidly as expected and on May 2, each of the delinquent companies was sent a letter stating that if their results were not received by July 14, we would not be able to enter them in the report. In spite of this, four companies have as yet furnished no results and two companies only partial results.

Conclusions

Commenting on the results it should be stated that after they were filed, it was learned that a number of the companies did not follow strictly the methods as given in the handbook. This was partly because the procedure as given was impossible to carry out, partly because if carried out the results would be so evidently wrong and partly because the laboratory in question distinctly disapproved of either apparatus or method. This somewhat vitiates the results which we hoped to obtain since this investigation was a study of the methods in the handbook and not of the ability of the different laboratories to determine the actual amounts of the various substances in the samples furnished. However, it is very plain that the methods are in dire need of revision and at the meeting of the Chemical Committee at Atlantic City in June, it was voted that the criticisms of these methods shuld be sent to every member of the Chemical Committee and that the chapter should be rewritten by the present Sub-Committee and submitted to the entire Chemical Committee for their approval. These criticisms together with the blue prints of the results leave if possible by mail within a week. As soon as the members have been heard from as to their attitude toward these, the rewriting of the chapter will be started and completed if possible, in time to submit to the Chemical Committee before the annual meeting.

(In the original report a detailed tabulation of results is given.—Editor.)

REPORT OF CHEMICAL SUB-COMMITTEE ON COOPERATIVE TESTS OF PURIFYING OXIDES, ACCORDING TO METHODS OF GAS CHEMISTS' HANDBOOK

W. A. Dunkley, Chairman, Memphis, Tenn.

At a meeting of the Chemical and Purification Committees of the A. G. A. at Association Headquarters, in New York, in February, it was decided to have the methods of the Gas Chemists' Handbook checked up by comparative analyses of various materials, carried out by several laboratories. Among the several sub-committees appointed to handle various departments of this work, was one to collect information relative to the accuracy and convenience of the prescribed methods for testing purifying oxides. The following is a report of this subcommittee:

In March, several samples of purifying oxides were collected at the laboratory of the Peoples Gas Light & Coke Co. in Chicago. These samples were selected with a view to applying oxides for test which were typical of the various kinds of oxide in practical use. Accordingly the samples selected included fresh materials, which were numbered serially as follows:

Various Samples of Oxide

1. A mine water oxide produced by the precipitation of iron oxide from iron bearing mine water, by finely ground calcium carbonate.

6. A borings oxide made by water rusting iron borings.

7. A natural ore oxide.

8. A by-product oxide residue from the treatment of bauxite in the aluminum industry.

The following oxides were also selected:

2. An oxide which had been used for purifying coal gas, dried and ground.

3. A water gas oxide similarly prepared.

4. A coal gas oxide, same material as sample No. 2 but without drying or grinding.

5. Water gas oxide same as No. 3 but without drying or grinding.

Preparation of Samples

The fresh oxides were ground in a power-driven mill to disintegrate all lumps and facilitate the taking of a series of uniform samples. There was no preliminary drying except sufficient air drying to permit the material to be ground easily. After grinding, the oxide was thoroughly mixed before sampling. Fresh oxides were shipped to the various laboratories in metal cans equipped with screw covers and hubber gaskets, (the regular coal sample cans used by the U. S. Bureau of Mines for shipping coal samples).

The sulphided materials (water gas and coal gas oxides) were each divided into two portions. One portion was dried in metal trays on top of a steam radiator, being stirred occasionally. This drying was continued until the materials had lost sufficient oil and water vapors so that they had become sufficietnly brittle to be ground. The grinding was sufficiently fine so 85 to 90 per cent would pass a 30-mesh screen. This was as fine grinding as the facilities available seemed to permit.

After grinding, the samples were thoroughly mixed with the small samples taken. One portion of each of the original foul oxide samples was left in a moist and unground state in order that it might be possible to compare the treatment of such samples by various laboratories. While the difficulty of sampling such coarse materials was appreciated, an effort was made to make all of the small samples alike, so far as could be judged from inspection. The foul oxides were shipped by express in sealed glass fruit jars.

Laboratories Supplied With Samples

Samples were shiped to the following companies or institutions:

Consolidated Gas Co. of New York.
Consolidated Gas Co. of Boston, Mass.
United States Improvement Co., Philadelphia, Pa.
Rockford Gas Light Co., Rockford, Ill.
Rochester Gas & Electric Corporation, Rochester, N. Y.
The Chemical Service Laboratories, West Conshohocken, Pa.
The Koppers Co., Pittsburgh, Pa.
Memphis Power & Light Co., Memphis, Tenn.
U. S. Bureau of Mines, Pittsburgh, Pa.
Peoples Gas Light & Coke Co., Chicago, Ill.

Fouling Test—Per Cent H_2S Decomposed in One Fouling

Laboratory	Sample Numbers 1	2	3	4	5	6	7	8
A	19.56					7.69	36.82	28.82
B	16.70					26.60	34.00	....
C	16.69					7.99	26.83	15.22
D	15.42					13.41	37.36	19.68
E	16.49					8.93	28.23	18.63
F	....					....	....	....
G	21.10					12.20	37.60	....
H	22.68					11.84	36.85	30.27

Conclusions

The comparative tests show conclusively that certain modifications of the methods of the Handbook, applying to oxides are needed. The variety of results obtained may be attributed to the following possible conditions:

1. Lack of uniformity of samples, due to method of preparing and shipping samples.

2. Uncertainty of testing methods employed.

3. Errors in laboratory tests or in calculations.

Each of these conditions is likely to enter, to a certain degree, in all determinations. For example, even with every possible precaution, certain oxides, especially those containing iron borings and shavings, are difficult to sample. We believe that the samples for this comparative test were taken as carefully as possible.

From the comments of the various laboratories (given in the original report but excluded from this abstracted version) we note a feeling of dissatisfaction with certain of the methods. They were not sufficiently clear cut to give a feeling of assurance. The tests for metallic iron, free sulphur, tarry matter and fouling, especially, seem to need improvement.

In view of the more or less standardized state of such determination, as calcium, ferric oxide, and total sulphur, it seems that variations in the results obtained from these determinations are likely due, to a certain extent, to the infrequency of applying these tests in some laboratories, or lack of attention to the minute details when using the methods.

Your sub-committee recommends that a committee be appointed for the coming year to study the methods which need revision with a view of discovering the weaknesses of these methods and substituing other methods if such methods can be devised.